

## **Appendix F Supporting Technical Reports**

F.5 Preliminary Floodplain Impacts and Mitigation Strategies



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# WETRO

#### **Technical Memorandum**

#### **METRO Blue Line LRT Extension (BLRT)**

5514 West Broadway Avenue, Suite 200, Crystal, MN 55428 www.bluelineext.org

To: Nick Landwer, P.E.

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Date: January 6, 2016

Subject: Preliminary Floodplain Impacts and Mitigation Strategies

#### 1.0 Introduction

#### 1.1 Project Location

The METRO Blue Line LRT Extension (BLRT) project will extend light rail passenger service from the Target Field Station in Minneapolis to Oak Grove Parkway/101st Avenue N in Brooklyn Park. The project corridor is approximately 13 miles and runs through the cities of Minneapolis, Golden Valley, Robbinsdale, Crystal, and Brooklyn Park. The project has been divided into six segments corresponding with municipal boundaries where possible, which have been labeled according to city. The portion within Brooklyn Park has been further divided into two segments: Brooklyn Park 1, which is the northernmost segment, and Brooklyn Park 2.

Roughly eight miles of the proposed project will be constructed within the existing BNSF Railway corridor. However, most of the Minneapolis segment is located within the median of TH 55 (Olson Memorial Highway), and portions of the two Brooklyn Park segments are within the median of CSAH 103 (West Broadway Avenue). The proposed project also includes the construction and/or reconstruction of affected roadways, construction of station platforms, several park-and-ride facilities, and an operations and maintenance facility (OMF).

Hennepin County is in the preliminary design phase of a portion of CSAH 103 (West Broadway Avenue) that coincides with a portion of the Brooklyn Park 1 segment. A separate environmental assessment worksheet (EAW) and preliminary stormwater design have been completed for the Hennepin County project, which incorporates the floodplain and wetland impacts and stormwater treatment best management practices (BMPs) required to treat runoff from the BLRT Extension project. These have been documented in the EAW and in supporting technical memoranda.

#### 1.2 Purpose

This Floodplain Technical Memorandum has been prepared in support of the BLRT Extension project Final Environmental Impact Statement (Final EIS). The objective of this memorandum is to evaluate the BLRT Extension project's potential impacts to floodplains within the study area and to identify potential mitigation measures. This includes the following:

- Identify regulatory requirements that will set forth mitigation standards that are specific to floodplain management.
- Identify potential mitigation areas that would be used to compensate for the floodplain impacts along the BLRT Extension project corridor.



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This report contains qualitative and quantitative design recommendations for the BLRT Extension project corridor that will be used by the consultant team preparing the Final EIS and will provide information on how the project would meet the various regulatory requirements.

#### 1.3 Data Collection

The Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) and the Flood Insurance Rate Maps (FIRMS) for Hennepin County (panel numbers 27053C0182E, 27053C0201E, 27053C0203E, 27053C0212E, 27053C0214E, and 27053C0352E) dated September 4, 2004, were used to identify floodplains and floodways within the BLRT Extension project corridor. The floodplains within the project area are associated with Bassett Creek, Grimes Avenue Pond, North Rice Pond, Shingle Creek, and the Century Channel Ponds. Note that the latter two water bodies fall within the purview of the CSAH 103 (West Broadway Avenue) EAW.

All floodplain elevations were adjusted from National Geodetic Vertical Datum 1929 (NGVD 29) to North American Vertical Datum 1988 (NAVD 88) by adding 0.20 feet to the NGVD 29 elevations. FEMA 100-year floodplain and floodway GIS shapefiles were downloaded from the DNR floodplain/floodway file transfer site and used to determine the impacts of the BLRT Extension project. The floodplain and floodway areas are shown on **Figures 1 to 12** in Appendix A. The DNR shapefiles had the following discrepancies:

- Century Channel Ponds 7 and 8 (DNR Wetland #559W) and a portion of the Shingle Creek floodplain had been omitted from the digitized GIS shapefile. These floodplain shapes were added by Engineering Services Consultant (ESC) team, based on the LiDAR contours below the adjusted 100-year floodplain elevations listed in FIS 27053CV001A. These areas are shown on Figures 9 and 10 in Appendix A.
- The City of Brooklyn Park is in the process of applying for a Letter of Map Revision (LOMR) from FEMA for a portion of the Shingle Creek floodplain on the west side of CSAH 103 (West Broadway Avenue), adjacent to the creek crossing. It is assumed that the LOMR will be approved, and the annotated DFIRM and hydraulic modeling prepared for the LOMR was used to determine the floodplain impacts at this location. The GIS shapefiles will be updated to reflect the LOMR once it has been approved.
- The floodplain boundary for Pond 5, which is located in the northeast quadrant of 93<sup>rd</sup> Avenue N and CSAH 103 (West Broadway Avenue), has also changed. The 610 Commerce Site was recently constructed at this location, and it is unknown at this time if the floodplain elevation has been altered. Based upon discussions with City Staff, a LOMR was not submitted for the impact to the floodplain of Pond 5, but based on aerial imagery, it is clear that the boundary shown on the FIRM is no longer accurate due to locations of buildings and parking lots.

#### 2.0 Regulatory Environment

Regulatory and permitting authority for floodplain impacts falls to the Local Government Unit (LGU), which is typically the municipality. Watershed management organizations (WMOs) also regulate floodplain impacts to waters within their jurisdictional authority. In addition to the LGUs and WMOs, FEMA and the DNR play a role in floodplain management and impacts to water resources within the study area. These include:

- Federal Emergency Management Agency (FEMA)
- Minnesota Department of Natural Resources (MnDNR)
- Mississippi Watershed Management Organization (MWMO)
- Bassett Creek Watershed Management Commission (BCWMC)
- Shingle Creek and West Mississippi Watershed Management Commissions (SCWMC and WMWMC, or SCWM WMC when referred to in reference to their joint watershed management plan)
- City of Minneapolis





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- City of Golden Valley
- City of Robbinsdale
- City of Crystal
- City of Brooklyn Park

#### 2.1 Federal Emergency Management Agency

FEMA, under the National Flood Insurance Program (NFIP) has the authority to regulate floodplains and floodways. Executive Order (EO) 11988 requires all federal agencies to evaluate and, to the extent possible, avoid adverse impacts to floodplain areas which may result in action they administer, regulate, or fund. EO 11988 specifically requires floodplain impacts to be considered in the preparation of environmental documents. This document identifies that the following four areas must be adequately addressed in the Final EIS:

- No significant potential for interruption of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.
- 2) No significant impact on natural or beneficial floodplain values.
- 3) No significant increased risk of flooding will result.
- 4) Will the project support and/or result in incompatible floodplain development?

These four areas are addressed in the 'Floodplain Impacts and Mitigation' section of this memo.

Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, was implemented on January 30, 2015. The EO 13690 amends EO 11988 and states that the floodplain shall be:

- 1) The elevation and flood hazard area that result from using a climate-informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science. This approach will also include an emphasis on whether the action is a critical action as one of the factors to be considered when conducting the analysis.
  - a. This could mean using flow rates based on the new precipitation intensity-duration-frequency curves, called Atlas 14, or using flows based on regression equations using more recent stream gage data. However, according to the FAQ section of the National Oceanic Atmospheric Administration (NOAA) website (<a href="http://www.nws.noaa.gov/oh/hdsc/FAQ.html#1.5">http://www.nws.noaa.gov/oh/hdsc/FAQ.html#1.5</a>), Atlas 14 volumes are "based on the assumption of stationary climate." It appears that the project's use of Atlas 14 precipitation frequencies would not qualify as a climate-informed science approach based on NOAA guidance.
- 2) The elevation and flood hazard area that result from using the freeboard value, reached by adding an additional two feet to the base flood elevation for non-critical actions and by adding an additional three feet to the base flood elevation for critical actions. The term 'critical action' shall mean any activity for which even a slight chance of flooding would be too great.
- 3) The area subject to flooding by the 0.2 percent (500-year) annual chance flood.
- 4) The elevation and flood hazard area that results from using any other method identified in an update to the Federal Flood Risk Management Standard (FFRMS).

The ESC team and the Final EIS team met with the Federal Transit Authority to discuss which of the above options would be most appropriate for the BLRT extension project to use. Based on that meeting, as well as a conversation with the Metropolitan Planning Organization, the BLRT Extension project is using Option 2, Noncritical Action (100-year elevation plus two feet of freeboard) to determine the elevation of the roadway profile, which will ensure the intent for resilient infrastructure in EO 13690 is met.



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Rivers and streams for which FEMA has prepared detailed engineering studies may have designated floodways. The floodway is the area of the floodplain that must remain free from obstruction so that the 100-year flood can be conveyed downstream. Placing fill or buildings in the floodway may block the flow of water and increase flood elevations. Such activities in the floodway are generally restricted and require mitigation in the form of compensatory storage volume to offset the lost floodway storage. Similarly, activities in the floodplain that reduce flood storage capacity are also restricted and would require compensatory storage volume. A project in a floodway must be reviewed to determine if the project will increase flood heights. An engineering analysis must be conducted before a permit can be issued. The community's permit file must have a record of the results of this analysis, which is in the form of a No-Rise Certification. The No-Rise certification must be supported by technical data and signed by a registered professional engineer.

#### 2.2 Minnesota Department of Natural Resources

On behalf of FEMA, the MnDNR, and the local government units (i.e., the cities and watershed management organizations) also regulate activities that may impact floodplains, including activities such as construction, excavation, or deposition of materials over, or under waters that may affect flood stage, floodplain, or floodway boundaries.

The MnDNR has developed regulatory standards for floodplain development within the State. Local government units must, at a minimum, adopt these standards. The requirement for allowing fill within the flood fringe is that it generally cannot:

- Increase the 100-year flood elevation more than ½ foot above the preexisting, natural unobstructed condition, or
- Increase the 100-year flood elevation if the filling would negatively impact existing floodplain development (even if the increase would be less than  $\frac{1}{2}$  foot)

The floodplain requirements of each community and WMO located along the project corridor meet or exceed the guidance provide by the MnDNR.

#### 2.3 Local Government Units

The project is located within the Bassett Creek Water Management Commission, Mississippi Watershed Management Organization, the Shingle Creek and West Mississippi Water Management Commission; and within the Cities of Minneapolis, Golden Valley, Crystal, Robbinsdale, and Brooklyn Park. Each of these cities and WMOs has rules and ordinances that address floodplain impacts and mitigation. Please see the Regulatory Matrix in Appendix B for more details on the floodplain regulations that pertain to this project.

#### 2.3.1 Mississippi Watershed Management Organization

The MWMO manages waters within its boundaries through its Watershed Management Plan that was amended in 2011. This plan complies with the water resource protection requirements under Minnesota Statutes 103A through 103G in conformance with Minnesota Rules Chapters 8410 and 8420. The communities within the boundaries include parts of Lauderdale, Minneapolis, St. Anthony, and St. Paul, as well as property owned by the Minneapolis Park and Recreation Board (MPRB).

The MWMO does not issue permits or provide approval letters for construction projects, but works with the member communities to ensure the implementation of its standards. MWMO's floodplain standards are that public roadways shall not flood when adjacent to stormwater storage basins or subsurface stormwater management BMPs designed to store the 100-year event.



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#### 2.3.2 Bassett Creek Water Management Commission

The BCWMC manages waters within its boundaries through its 2015 – 2025 Watershed Management Plan. This Plan complies with the water resource protection requirements under Minnesota Statutes 103A through 103G in conformance with Minnesota Rules Chapters 8410 and 8420. The BCWMC is governed by a Joint Powers Agreement that is held between the watershed organization and the member communities that are located within the boundaries of the WMO. The member municipalities include Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, Robbinsdale, and St. Louis Park.

The BCWMC's rules address floodplain alteration within the watershed. The rules prohibit new structures or improvements in the floodplain, which would be subject to damage by the 100-year flood, including basements, public utilities, and streets. Where streets, utilities, and structures currently exist below the 100-year floodplain, BCWMC encourage member cities to remove these features as development/redevelopment allows. Projects within the floodplain must maintain no net loss to floodplain storage and no increase in flood level at any point along the trunk system. The BCWMC defines the trunk system as including the Bassett Creek Main Stem (including the East Channel), Grimes Pond, North Rice Pond, South Rice Pond, and inundations areas in Mary Hills Nature Area and Theodore Wirth Regional Park (TWRP). The BCWMC rules prohibit expansion of existing non-conforming land uses within the floodplain unless fully flood-proofed.

#### 2.3.3 Shingle Creek and West Mississippi Watershed Management Commissions

The SCWMC and WMWMC are two separate WMOs; however, they plan and conduct business jointly, managing waters within its boundaries. Each is governed by a Joint Powers Agreement that is held between the watershed organization and the communities/members that are located within the boundaries of the WMOs. The communities within the boundaries include parts of Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Osseo, Plymouth, Robbinsdale, and Champlin.

The SCWM WMC manages waters through its Third Generation Watershed Management Plan, which was adopted in 2013. This Plan complies with the water resource protection requirements under Minnesota Statutes 103A through 103G in conformance with Minnesota Rules Chapters 8410 and 8420.

The SCWM WMC's rules address floodplain alteration within the watershed. No person or political subdivision shall alter or fill land below the 100-year critical flood elevation of any public waters, public waters wetland, or other wetland without first obtaining an approved project review from the Commission. Floodplain alteration or filling shall not cause a net decrease in flood storage capacity below the projected 100-year critical flood elevation unless it is shown that the proposed alteration or filling, together with the alteration or filling of all other land on the affected reach of the waterbody to the same degree of encroachment as proposed by the applicant, will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows. The SCWM WMC also requires compensatory storage for floodplain fill.

The SCWM WMC also requires approval of a project review of any new or improved crossing of Shingle Creek. The crossings shall retain adequate hydraulic capacity based on the hydraulic model of the creek, not adversely affect water quality, represent the "minimal impact" solution to a specific need with respect to all reasonable alternatives, and allow for future erosion, scour, and sedimentation maintenance considerations.

#### 2.3.4 City of Minneapolis

The City of Minneapolis' Floodplain Overlay District Ordinance (Chapter 551) includes regulations for managing land uses in the mapped floodplain. The ordinance states that linear projects within the floodplain shall be designed to minimize the increases in flood elevations and shall be compatible with local comprehensive floodplain development plans. Protection to the regulatory flood protection elevation (RFPE) shall be provided where failure or interruption of public facilities would result in danger to public health or safety where facilities are essential to



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orderly functioning of the area. Conditional uses in the Floodway District are allowed provided such uses shall have a low flood damage potential, shall not cause an increase in the stage of the regional flood, or cause an increase in flood damages in the reach(es) affected.

#### 2.3.5 City of Golden Valley

The City of Golden Valley's Floodplain Management Zoning Overlay District Ordinance (Section 11.60) states that linear projects may be located in the floodplain provided they are designed to minimize increases in flood elevation and are compatible with the BCWMC Management Plan. These uses can cause no increase in stage to the 100-year flood within the floodway and cannot increase the floodplain elevation by more than  $\frac{1}{2}$  foot in a designated Zone A or AE where a floodway has not been designated. Protection to the RFPE shall be provided where failure or interruption of these public facilities would endanger the public health or safety or where such facilities are essential to the orderly functioning of the area.

#### 2.3.6 City of Robbinsdale

The City of Robbinsdale's Floodplain Management District Ordinance (Section 530.01) states that no structure, fill (including for roads and levees), deposit, obstruction, storage of materials or equipment, or other uses may be allowed as a conditional use in the floodway that will cause any increase in the stage of the 100-year regional flood or cause an increase in flood damages in the reach(es) affected. Floodplain development shall not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system where a floodway or other encroachment limit has not been specified on the Official Zoning Map.

#### 2.3.7 City of Crystal

The City of Crystal's Floodplain Overlay Ordinance (Chapter 515.61) states that no structure, fill (including for roads and levees), deposit, obstruction, storage of materials or equipment, or other uses may be allowed as a conditional use in the floodway that will cause any increase in the stage of the 100-year regional flood or cause an increase in flood damages in the reach(es) affected. Floodplain development shall not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system where a floodway or other encroachment limit has not been specified on the Official Zoning Map.

#### 2.3.8 City of Brooklyn Park

The City of Brooklyn Park has adopted zoning regulations to manage land uses in the mapped floodplain. These regulations include the minimum federal and state regulations, which are enforced in the 1-percent chance (100-year) floodplain that is mapped on the Flood Insurance Rate Map (FIRM) for Brooklyn Park. The Brooklyn Park ordinance requires that no fill, excavation, or storage of materials or equipment that obstruct flows or increase flood elevations will be permitted within the flood fringe or floodway.

#### 3.0 Floodplain Impacts and Mitigation

There are several floodplains within the project area that will be impacted by the construction of the BLRT Extension project. Floodplain impacts were estimated based on a conceptual (10 percent) design of the project corridor. The floodplain impacts may be revised as the design for the project progresses, but they are not expected to increase. The following sections include a summary of the impacts and identify potential on-site floodplain storage mitigation areas that have been preliminarily evaluated for the project. **Table 1**, **Floodplain Impacts by Water Body**, provides a summary of the floodplain impacts throughout the corridor.



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Table 1. Floodplain Impacts by Water Body

Water Body	Type of Encroachment	Length (ft)	Volume of Floodplain Impact (cy)
Bassett Creek	Longitudinal	5,310 <sup>(1)</sup>	16,800
Grimes and North Rice Ponds	Transverse	1,200 (2)	200
Shingle Creek	Transverse	(3)	(3)
Setzler Pond	Transverse	(3)	(3)
DNR Wetland #559W	Transverse	(3)	(3)

- (1) Impacts listed are on the east and west sides of the BLRT guideways.
- (2) Impacts listed include the bridge piers and the south abutment.
- (3) See <u>West Broadway EAW</u> for detailed floodplain fill impacts (see <u>www.hennepin.us/westbroadway</u> for a link to the EAW).

#### 3.1 Bassett Creek

#### 3.1.1 Affected Environment

The Bassett Creek Main Stem is located on the west side of the BNSF Railway and BLRT corridor through TWRP from south of TH 55 (Olson Memorial Highway) to Bassett Creek Drive, within portions of the Minneapolis and Golden Valley segments. The East Channel of Bassett Creek is located on the east side of the existing BNSF Railway corridor, and is connected by existing culverts that cross the existing Canadian Pacific (CP) and BNSF Railway corridors. There is also a flood control structure located on Bassett Creek on the north side of TH 55 (Olson Memorial Highway). This structure is not expected to be impacted by the project. See **Figures 2 and 3** for the location.

The ESC team received the FEMA-approved HEC-2 models for Bassett Creek from the MnDNR, and from Ferris Chamberlain, who did the last updates to the modeling for the United States Army Corps of Engineers (USACE) in the late 1990s. The model sets were identical, and are the basis of the 100-year floodplain and floodway boundaries shown on the FIRMs for Bassett Creek, which are the regulated boundaries for the creek. The creek's large floodplain includes both a conveyance element as well as a large storage element due to the flood control structure. As such, the floodway extents in TWRP were "administratively determined" by the Bassett Creek Flood Control Commission, the MnDNR, the City of Golden Valley, and FEMA as part of a management "envelope" to limit development within areas necessary for flood control.

The ESC team converted the models into HEC-RAS to create duplicate-effective models, which will be corrected to match existing conditions once all the survey data has been collected. The proposed conditions model will be refined as the project design progresses.

#### 3.1.2 Proposed Conditions

As part of the BLRT Extension project, the existing BNSF track will be shifted to the western 50 feet of the existing 100 foot rail corridor. This will result in impacts to the Bassett Creek floodplain. An access road will be constructed on the west side of the proposed BNSF track from TH 55 (Olson Memorial Highway) to Theodore Wirth Parkway. Due to poor soils and wetlands, the access road has been eliminated from Theodore Wirth Parkway to the northern end of the Golden Valley segment. Westbound TH 55 (Olson Memorial Highway) will be realigned to the north to accommodate the BLRT guideway, extending into the area adjacent to the East Channel Bassett Creek. A retaining wall is proposed to limit the amount of fill placed into the area near the upstream end of the culvert crossing the highway.



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The preliminary floodplain strategy has been to include impacts and mitigation for the access road, which is generally where potential expansion of the BNSF Railway would occur. The existing culverts that convey the East Channel Bassett Creek under the BNSF Railway corridor will be reconstructed to accommodate the freight and LRT tracks. The existing culvert that conveys the East Channel Bassett Creek will be studied for capacity to determine if it needs to be reconstructed. The cross-sections from the HEC-RAS models have been compared against LiDAR data for the area and are very similar. The ESC team conducted a sensitivity analysis in the HEC-RAS models by incorporating the potential floodplain fill from the proposed project. The sensitivity analysis resulted in no increase to the 100-year water surface elevation. This is understandable given the large size of the floodplain relative to the project impacts, and that the floodplain elevation is controlled by both the flood control structure at TH 55 (Olson Memorial Highway) and the overflow provided by a low point in TH 55 (Olson Memorial Highway).

The total proposed floodplain fill within the Bassett Creek floodplain, is 16,800 cubic yards. These include impacts to the Main Stem and East Channel Bassett Creek between TH 55 (Olson Memorial Highway) and Bassett Creek Drive. A floodplain mitigation area has been identified within TWRP, between Bassett Creek Main Stem and the BLRT and BNSF Railway corridor. The City of Minneapolis owns an easement over the mitigation area, as well as other areas within TWRP. The mitigation would include excavation of adjacent ground below the 100-year floodplain elevation to provide compensatory floodplain storage for the fill placed within the floodplain. The mitigation site will be designed in collaboration with MPRB and the City of Minneapolis. See **Figure 2** for the location of the potential floodplain mitigation area.

#### 3.2 Grimes and North Rice Ponds

#### 3.2.1 Affected Environment

Grimes and North Rice Ponds are located within the BCWMC north of Golden Valley Road in the City of Robbinsdale. The existing BNSF Railway corridor transects the Grimes and North Rice Ponds, which discharge to Bassett Creek Main Stem. The BNSF track is located on embankment between the two ponds, and is located above the 100-year floodplain elevation. The floodplain boundary shown on the FIRM includes portions of residential properties and roadways on the north side of Grimes Pond. The City Engineer confirmed that these areas are within the 100-year floodplain.

#### 3.2.2 Proposed Conditions

The BLRT Extension project will result in widening of the existing corridor. The BLRT guideway will be constructed on a new bridge due to poor soils, and in order to reduce floodplain impacts. The BNSF track will remain on the current embankment. There will be minor floodplain fill at the south end of the bridge and from the bridge piers.

#### 3.3 Shingle Creek

#### 3.3.1 Affected Environment

The 100-year floodplain and floodway associated with Shingle Creek crosses the BLRT Extension project at the existing culvert crossing at CSAH 103 (West Broadway Avenue). The mapped floodplain is wider on the upstream (west) and downstream (east) ends of the crossing than it is immediately at the crossing. As mentioned previously, the City of Brooklyn Park is in the process of obtaining a LOMR approval for this area, which reduces the floodplain extents on the upstream side of the culvert to account for fill that was placed within the property directly adjacent to CSAH 103 (West Broadway Avenue) on the south side of Shingle Creek and a floodplain mitigation area that was constructed on the opposite side of the Creek from the impacted property.





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#### 3.3.2 Proposed Conditions

As part of a separate project, Hennepin County will be reconstructing CSAH 103 (West Broadway Avenue) from approximately Candlewood Drive N to approximate northbound station 2651+15. The BLRT corridor will be located within the median of the CSAH 103 (West Broadway Avenue) corridor. A separate Environmental Assessment Worksheet (EAW) has been prepared for the CSAH 103 (West Broadway Avenue) project, and includes information on the floodplain impacts within that project area. There are no floodplain impacts to Shingle Creek associated with the BLRT Extension project. See the CSAH 103 (West Broadway Avenue) EAW for more information on the impacts and mitigation associated with that project.

#### 3.4 Century Channel Ponds

#### 3.4.1 Affected Environment

The Century Channel Ponds include Setzler Pond, DNR Wetland #559W, and Pond 5. Historically, these basins were part of Century Channel, which now consists of a series of wetlands, ponds, and culverts also known as Edinbrook Channel that discharge to Mattson Brook east of CSAH 103 (West Broadway Avenue), and ultimately to the Mississippi River. The Century Channel Ponds were added to the Hennepin County FIS and FIRM through a LOMR in the early 2000s. Setzler Pond is located in the northwest quadrant of the intersection of 89th Avenue N and CSAH 103 (West Broadway Avenue). DNR Wetland #559W is located between 92nd Avenue N and Setzler Parkway, and is bisected by CSAH 103 (West Broadway Avenue). Pond 5 of the Century Channel Ponds is located in the northeast quadrant of CSAH 30 (93rd Avenue N) and CSAH 103 (West Broadway Avenue).

#### 3.4.2 Proposed Conditions

There are no floodplain impacts to Setzler Pond or DNR Wetland #559W associated with the BLRT Extension project. See the CSAH 103 (West Broadway Avenue) EAW for more information on the impacts and mitigation impacts associated with that project. The Pond 5 floodplain was recently impacted by development, and it is unknown at this time if the floodplain elevation or boundary has been altered.

#### 3.5 Impact Analysis

This project will not result in any significant floodplain impacts for the following reasons:

- 1) No significant interruption of termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.
  - a. All major roadways, including TH 55 (Olson Memorial Highway) and CSAH 103 (West Broadway Avenue), and BLRT guideway grades will be designed to be two feet above the 100-year floodplain elevation, in order to be in compliance with EO 13690.
- 2) No significant adverse impact on natural and beneficial floodplain values should result from this project.
  - a. No fisheries impacts are anticipated. Construction operations in the creeks will not occur during fish spawning and migration periods.
  - b. The wetland impacts and mitigation are discussed in a separate wetland technical memorandum.
  - c. No threatened or endangered plants or animals have been identified in the floodplains.
  - d. Appropriate turf establishment and erosion control measures will be used.
- 3) No significant increased risk of flooding will result.
  - a. No significant change in 100-year water surface elevations is anticipated as a result of the BLRT Extension project. Hydraulic analysis indicates that the proposed fill within the Bassett Creek floodplain will not result in an increase to the 100-year floodplain elevation, and a 'No-Rise Certificate' will be completed, which states that there will be no rise in the floodplain elevation.
- This project should not result in any incompatible floodplain development.

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a. The LGUs and WMOs located throughout the corridor have floodplain ordinances that regulate floodplain development. The ordinances conform to the MnDNR Floodplain Management guidelines. No new access to a floodplain area is being created by the BLRT Extension project.

#### 4.0 Conclusion

The Floodplain Technical Memorandum has been prepared in support of the Final EIS for the BLRT Extension project. The memorandum includes a summary of the regulatory environment for floodplain management within the project area, a summary of the proposed floodplain impacts from the project, and identifies potential floodplain mitigation areas within the project corridor. Figures 1 through 12 in Appendix A show the locations of the floodplains, proposed impacts, and potential mitigation sites. The information in the memorandum will be used by the consultant team preparing the Final EIS and will provide information on how the project would meet various regulatory requirements.





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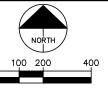
#### **APPENDIX A. FLOODPLAIN FIGURES**





FLOODPLAIN IMPACTS AND MITIGATION STATEGIES FIGURE 1 OF 12

10/7/2015





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FLOODPLAIN IMPACTS AND MITIGATION STRATEGIES FIGURE 2 OF 12

10/7/2015

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FLOODPLAIN IMPACTS AND MITIGATION STRATEGIES FIGURE 4 OF 12

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FIGURE 5 OF 12

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**BLUE LINE LRT EXTENSION** 

FLOODPLAIN IMPACTS AND MITIGATION STRATEGIES FIGURE 6 OF 12

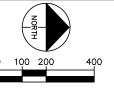






FLOODPLAIN IMPACTS AND MITIGATION STRATEGIES FIGURE 8 OF 12

10/7/2015





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FLOODPLAIN IMPACTS AND MITIGATION STRATEGIES FIGURE 9 OF 12

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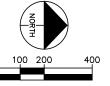
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**BLUE LINE LRT EXTENSION** 

FLOODPLAIN IMPACTS AND MITIGATION STRATEGIES FIGURE 10 OF 12











METROPOLITAN C 0 U N C I

FIGURE 12 OF 12



METRO Blue Line LRT Extension (BLRT)
5514 West Broadway Avenue, Suite 200, Crystal, MN 55428 www.bluelineext.org

#### **APPENDIX B. SUMMARY OF REGULATORY CRITERIA**

#### Blue Line LRT Extension Water Resources - Regulatory Matrix - DRAFT 2/5/2015

Revised 10/5/2015

RFPE = Regulatory Flood Protection Elevation (2)

Requirements Summary								
Organization	Applies to	Rainfall Data	Rate Control	Water Quality (1)	Volume Control	Floodplain/Flood Control Requirements	Plan Review Process	Comments
MWMO MWMO Watershed Management Plan 2011-2021, dated May 10, 2011	Segment M	TP-40 or "subsequent revisions"	10-, and 100-year; may be restricted to less than pre-development rates when the capacity of the downstream conveyance system is limited	Remove 90% TSS from 95th percentile daily rainfall total (1.17 in. over 24 hrs) over entire project area, or Alternate Compliance which involves payments and/or credits and is summarized in MWMO standards document	Includes statement: placeholder for future volume standard by ~ 2013	Public Roadway Condition - roadway shall not flood when adjacent to stormwater storage basin or subsurface stormwater managmeent BMP designed to store the 100-year event. Freeboard requirement set by road authority. Alternative - minimum freeboard requirement above the 100-year HWL may be calculated as the height determined by adding depth of volume of runoff received by BMP from two-year event over the BMP.	The MWMO works with the member communities to ensure the implementation of its standards. The MWMO recommends members adopt its ordinance-ready MWMO Standards language into their local ordinances.	Note in the Standards Section that the MWMO will be working with agencies and its member organizations over the next 2.5 years to review or determine new water quality and volume standards.
BCWMC 2015-2025 Watershed Management Plan, dated September 2015	Segment GV and Segment R	Atlas 14	100-year events	Meet MIDS performance goals FOR LINEAR PROJECTS: Retention of whichever is greater: - 0.55 in from new or fully reconstructed areas or -1.1 in from the net increase in impervious areas  If the MIDS performance goal is not feasible and/or is not allowed for a proposed project, then the project must implement the MIDS flexible treatment options, as shown in the MIDS Design Sequence Flow Chart	Meet MIDS performance goals FOR LINEAR PROJECTS: Retention of whichever is greater: - 0.55 in from new or fully reconstructed areas or -1.1 in from the net increase in impervious areas  If the MIDS performance goal is not feasible and/or is not allowed for a proposed project, then the project must implement the MIDS flexible treatment options, as shown in the MIDS Design Sequence Flow Chart	Prohibits new structures or improvements in the floodplain, which would be subject to damage by the 100-year flood, including basements, public utilities, and streets. Where streets, utilities, and structures currently exist below the 100-year floodplain, BCWMC encourages member cities to remove these features as development/redevelopment allows. Projects within the floodplain must maintain no net loss to floodplain storage and no increase in flood level at any point along the trunk system. Prohibits expansion of existing nonconforming land uses within floodplain unless fully flood-proofed.  OLD REQUIREMENTS DOC: Filling will generally not be allowed within the floodplain. Proposals to fill within the established floodplain must obtain BCWMC approval and must provide compensating storage and/or channel improvement so that the flood level shall not be increased at any point along the trunk system due to the fill	BCWMC reviews development/redevelopment proposals after project receives preliminary review by municipality indicating general compliance with existing local water management plan. Complex projects may require additional review time. All submittals involving floodplains, Bassett Creek trunk system, appropriations, variances, underground wet vaults or other alternative BMPs are presented at the BCWMC meetings.	Requirements for Improvements and Development Proposals' document has not been updated to match the revised standards in the 2015 Draft plan.

Requirements Summary				T				
Organization	Applies to	Rainfall Data	Rate Control	Water Quality (1)	Volume Control	Floodplain/Flood Control Requirements	Plan Review Process	Comments
SCWMC Rules and Standards,	Segment C, Segment BP2, and Segment BP1	Atlas 14		Remove 60% of P and 85% of TSS  Use NURP ponds or infiltrate all site runoff from 1.3-inch event  NURP pond dead storage requirement is runoff from 2.5-inch storm event over the contributing drainage area  Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the net new impervious surface.	Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the <b>net new impervious surface</b> .	proposed alteration or filling, together with the alteration or filling of all other land on the affected reach to the same degree of encroachment will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows.	The Commission reviews proposed land development and redevelopment projects affecting water resources. Projects are reviewed in accordance with the management standards and policies of the SCWMC and recommendations are made to the member City in which the project is located. It is the City's responsibility to enforce the Commission's recommendations. Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the net new impervious surface. Projects impacting wetlands where Commission is LGU must be reviewed regardless of size. Plans for developemtn within the 100-year floodplain as defined by the FIS must be reviewed.	
MPCA (via NPDES permit issued 8/1/2013)  As of 2/5/2015, the impaired and special waters within 1 mile of corridor include: Shingle Creek Upper Twin Lake Middle Twin Lake Lower Twin Lake Crystal Lake Bassett Creek Mississippi River	All segments	N/A		runoff from new impervious surfaces must be retained on site. If infiltration is prohibited,must use other methods of volume reduction and the water quality volume (or remainder if some volume reduction is achieved) must be treated by a wet sedimentation basin, filtration system, regional ponding or equivalent methods prior to discharge of stormwater to surface waters.  If use wet sedimentation pond to provide treatment, dead storage requirement is 1800 cubic feet per acre of surface area drained.	other methods of volume reduction and the water quality volume (or remainder if some volume reduction is achieved) must be treated by a wet sedimentation basin, filtration system, regional ponding or equivalent methods prior to		SWPPP must be submitted to MPCA for review if the project size is 50 acres or more and will discharge to special or impaired waters.  Application and SWPPP must be submitted at least 30 days before the start of the construction activity.	The General Permit used to develop this matrix expires on 8/1/2018. It will be necessary to verify how any proposed changes in the permit would apply to this project.
	OMF and park-and-ride buildings in all segments		and vegetation conditions for 2- and 10-year, 24 hr design storms	Remove 80% of post development TSS Remove 60% of post development TP	Retain 1.1 inches from all new or redeveloped impervious	N/A	N/A	Minimize the negative impacts of the project, both on and off site, by maintaining a more natural hydrologic cycle through infiltration, evapotranspiration, and reuse.

Requirements Summary	I	1	I		I			
Organization	Applies to	Rainfall Data	Rate Control	Water Quality (1)	Volume Control	Floodplain/Flood Control Requirements	Plan Review Process	Comments
City of Minneapolis  Email from Jeremy Strehlo, dated 1/23/15  Minneapolis Floodplain Overlay District Ordinance (Chapter 551.540)  Minneapolis Erosion and Sediment Control and Drainage Ordinance (Chapter 52)  Minneapolis Stormwater Ordinance (Chapter 54)			Maintain discharge rates at or below the existing rates.  May be restricted to less than existing rates when the capacity of the downstream conveyance system is limited		N/A	Linear projects within the floodplain shall be designed to minimize increases in flood elevations and shall be compatible with local comprehensive floodplain development plans.  Protection to the RFPE shall be provided where failure or interruption of public facilities would result in danger to public health or safety where facilities are essential to orderly functioning of the area.  Conditional uses in Floodway District allowed provided such uses shall have a low flood damage potential, shall not cause an increase in the stage of the regional flood or cause an increase in flood damages in the reach(es) affected.	Must submit application and obtain approval for Storm Water Management Plan from the city engineer. Requirements are included in Chapter 54.70 of City Code.	
City of Golden Valley	Segment GV		Must meet BCWMC standards.	Must meet BCWMC standards.	Must meet BCWMC standards.	floodplain provided they are designed to minimize increases in flood elevation and are compatible with the BCWMC	Floodplain alteration permit will be submitted to the City, which will then submit the information to the DNR Commisssioner and BCWMC for	

Requirements Summary								
Organization	Applies to	Rainfall Data	Rate Control	Water Quality (1)	Volume Control	Floodplain/Flood Control Requirements	Plan Review Process	Comments
City of Robbinsdale  Robbinsdale 2030  Comprehensive Plan -  Appendix IIIA Storm Water  Management Plan	Segment R			Must meet SCWMC and BCWMC standards.	standards.	as a conditional use in the <b>floodway</b> that will cause any increase in the stage of the 100-year regional flood or cause an	See SCWMC and BCWMC plan review process for stormwater management.  Floodplain Alteration - must submit application for review to the City's Zoning Administrator and obtain all necessary State and Federal permits.	
City of Crystal 2009 Local Surface Water Management Plan and Land Use and Planning Ordinance	Segment C		will not occur as a result of the proposed land disturbing or development activity.	permanent pond surface area = to 2% of impervious area draining to pond, or 1% of entire area draining to pond,	include volume control standard that is in line with most restrictive between SCWMC and MPCA as it relates to discharge to impaired waters.	No structure, fill (including for roads and levees),, or other uses may be allowed as a conditional use in the <b>floodway</b> that will cause any increase in the stage of the 100-year regional flood or cause an increase in flood damages in the reach(es) affected. Floodplain developments shall not adversely affect the hydraulic capacity of the channel and adjoining floodplain of any tributary watercourse or drainage system where a floodway or other encroachment limit has not been specified on the Official Zoning Map.	that fall within the watershed review	
City of Brooklyn Park  Email from Kevin Larson (City), dated 2/4/14  Flood Hazard Area Overlay Ordinance (152.510)	Segment BP1 and Segment BP2		Must meet SCWMC standards.	Must meet SCWMC standards.		Railroad tracks, roads, and bridges must be elevated above the regulatory flood protection elevation where failure of facilities would result in danger to public healthy/safety or where facilities are essential to orderly function of area. None of these uses shall increase flood elevations. No fill, excavation, or storage of materials or equipment that obstruct flows or increase flood elevations will be permitted.	Must submit application to City Manager. SCWMC will review projects that fall within watershed review authority.	

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All regulatory entities will have requirements for erosion and sediment control and at a minimum will refer back to the NPDES requirements.

<sup>(1)</sup> Wet stormwater pond design should follow the guidelines in the MPCA Stormwater Manual for dead storage depth, side slopes, and benches.

<sup>(2)</sup> Refers to an elevation 1 foot (minimum) above the 100-year flood plus any stage increase due to the designation of flood fringe areas. In Minnesota, the floodplain management ordinances (local regulations) require that the elevation of the surface of the lowest floor of a dwelling be at or above the regulatory flood protection elevation. Local regulations will also require the top of the access road elevations to be within 2 feet of the flood protection elevation.



# **Appendix F Supporting Technical Reports**

#### **F.6 Wetlands Technical Report**



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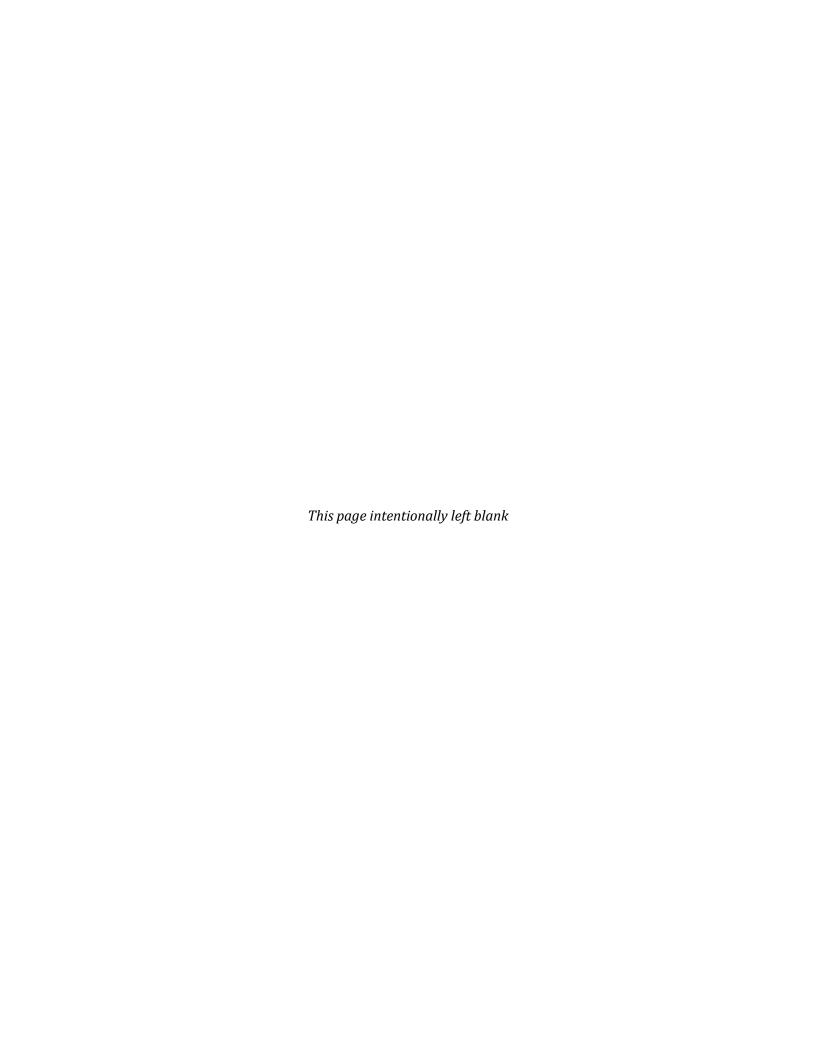


### **Wetlands Technical Report**

May 2016

Blue Line Extension Project Technical Report







#### **Executive Summary**

This technical report summarizes Water Resources within the proposed METRO Blue Line Light Rail (BLRT) Extension project area. The intent of this technical report is to support and augment the Final Environmental Impact Statement (Final EIS) being prepared for this project. Wetlands, floodplains and other aquatic resources within the proposed BLRT Extension project area were examined during 2015 with field work and published data sources. Impacts to wetlands and aquatic resources, described in this technical report, were established based on the limits of disturbance for the proposed BLRT Extension project. Floodplains and floodways are described in the *Floodplain Technical Memorandum* (January 2016). Some delineated basins within the proposed BLRT Extension project area are clearly natural wetlands; whereas, others have been excavated in uplands for the purpose of stormwater management.

Some wetlands are regulated by the Wetland Conservation Act (WCA) and others are not. Some wetlands are regulated by the US Army Corps of Engineers (USACE), and others, such as "non-Waters of the United States (non-WOUS)" and isolated basins are not regulated by USACE. Impacts to wetland basins requiring mitigation per WCA are 6.2815 acres. Impacts to wetland basins requiring USACE mitigation are 4.1623 acres. Required mitigation for wetland impacts will be a combination of on-site wetland mitigation and credit purchases from suitable private wetland mitigation banks. Jurisdiction of delineated basins per WCA and USACE has been established based on agency review and concurrence with conclusions in the *Technical Memorandum: Jurisdictional Issues Associated with Delineated Basins; Blue Line Extension LRT*.

May 2016



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## 1 Introduction

This technical report supplements the Final Environmental Impact Statement (Final EIS) associated with the proposed METRO Blue Line Light Rail (BLRT) Extension project.

**Figure 1** on page 23 shows a general location map. **Figure 2** beginning on page 25 shows a 24-page mapbook of water resources throughout the proposed BLRT Extension project area including aerial imagery, delineated wetland boundaries, updated National Wetland Inventory (NWI), Public Waters Inventory, municipal and watershed boundaries, and floodplains and floodways. **Figure 3** beginning on page 49 shows a 24-page mapbook that focuses on water resources, mapped hydric soils and LiDAR 2-foot contours.

# 1.1 Project Limits

The proposed BLRT Extension project connects Brooklyn Park north of 101st Avenue North southward along West Broadway Avenue (County State-Aid Highway 103) to approximately 74th Avenue North, then southwest adjacent to existing BNSF Railway (BNSF) freight rail tracks to Olson Memorial Highway (Trunk Highway [TH] 55), then eastward along Olson Memorial Highway to the Target Field Station in downtown Minneapolis.

The area that lies roughly between 94th Avenue North and Candlewood Drive North is part of the separate West Broadway Avenue Reconstruction project. A description of water resources within this area is provided in the Environmental Assessment Worksheet (EAW) and associated technical memoranda for the West Broadway Avenue Reconstruction project.

# 1.2 Report Purpose

The purpose of this technical report is to summarize water resources within the proposed BLRT Extension project area and describe their regulatory context and potential impacts to them and mitigation for their impacts. Existing and proposed stormwater management within the proposed BLRT Extension project area is described in a separate *Stormwater Technical Memorandum* (January 2016). A description of floodplains and floodways and proposed impacts to and mitigation for them is described in a separate *Preliminary Floodplain Impacts and Mitigation Strategies Technical Memorandum* (January 2016), or *Floodplain Technical Memorandum*.

#### 1.3 Data Collection

Various geo-referenced data were collected to inform the assessment of water resources within the proposed BLRT Extension project area. These data sources include aerial imagery, the updated NWI, the Hennepin County Soil Survey, Public Waters Inventory maps, floodplain and floodway maps, LiDAR two-foot contour maps, parcel maps, and municipal and watershed boundary maps.

Additional data were collected in the field and locations were recorded in field notes and with global positioning system (GPS) units capable of sub-foot accuracy. These data were added to geographic information systems (GIS) files and depicted in figures associated with this technical report.



# 2 Wetlands, Streams and Other Aquatic Resources

# 2.1 Regulatory Context

Wetlands and other aquatic resources in the proposed BLRT Extension project area are regulated by several agencies at the local, state, and federal levels including the US Army Corps of Engineers (USACE) and the US Environmental Protection Agency (EPA) at the federal level; the Minnesota Board of Water and Soil Resources (BWSR) and the Minnesota Pollution Control Agency (MPCA) at the state level; and the Minnesota Wetland Conservation Act (WCA) Local Governmental Unit (LGU) at the local level. Any proposed work below the ordinary high water (OHW) elevation in public waters, public waters wetlands, or unnumbered public watercourses is regulated by the Minnesota Department of Natural Resources (DNR).

## 2.1.1 Federal Regulation

Wetlands are defined in federal Executive Order 11990 as follows:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

USACE regulates wetlands per the Clean Water Act. According to the USACE Wetlands Delineation Manual (USACE, 1987) and the Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Midwest Region (USACE, 2012) one positive indicator (except in certain situations) from each of three elements must be present in order to make a positive wetland determination, which are as follows:

- Greater than 50 percent dominance of hydrophytic plant species.
- Presence of hydric soil.
- The area is either permanently or periodically inundated, or soil is saturated to the surface during the growing season of the dominant vegetation.

USACE regulates those areas that meet the definition of wetlands. Those wetland basins that are isolated hydrologically on the landscape, i.e., those with no inlets or outlets, are not typically regulated by USACE. However, if a Preliminary Jurisdictional Determination is requested, then USACE will assume jurisdiction regardless of hydrologic connection.



### 2.1.2 State Regulation

BWSR is the lead state agency that administers the WCA. WCA LGUs are delegated by the WCA to issue Notices of Decision regarding concurrence on delineated wetland boundaries and types, and approvals for wetland replacement plans. The WCA LGU has jurisdiction over portions of wetlands that lie above the OHW level.

DNR has jurisdiction over public waters and public waters wetlands. The upper elevation limit of public waters and public waters wetlands is the OHW mark. In some cases, the elevation of the OHW has been calculated with hydraulic modeling. In other cases, the OHW is estimated through examination of evidence of hydrology and vegetation. Sometimes the bankfull streambank elevation serves as the demarcation of DNR jurisdiction.

Minnesota public waters and public waters wetlands are defined by Minnesota Statute 103G.005 as follows:

- **Public waters** are all waterbasins and watercourses that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15 that are identified on Public Waters Inventory maps authorized by Minnesota Statutes, Section 103G.201.
- Public waters wetlands are all types 3, 4, and 5 wetlands as defined in US Fish and Wildlife Service (USFWS) Circular No. 39 (1971 edition), not included within the definition of public waters, that are 10 or more acres in size in unincorporated areas or 2.5 acres or more in incorporated areas.

## 2.1.3 Local Regulation

Relevant WCA LGUs in the proposed BLRT Extension project area include:

- City of Golden Valley
- Shingle Creek Watershed Management Commission
- City of Crystal
- Bassett Creek Watershed Management Commission
- City of Minneapolis

For purposes of the proposed BLRT Extension project, the WCA LGUs listed above retain their approval authority; however, in order to simplify the approval process, the WCA approvals are being processed by two representatives of the WCA LGUs. One representative will process approvals on behalf of the relevant WCA LGUs for water resources north of 36th Avenue North in the City of Robbinsdale and the other representative will process approvals on behalf of relevant WCA LGUs for water resources south of 36th Avenue North in the City of Robbinsdale and east to the Target Field Station.



#### 2.2 Affected Environment

#### 2.2.1 Wetlands

Forty-four basins were delineated within the proposed BLRT Extension project area. Additional basins, delineated within the West Broadway Avenue Reconstruction project limits, are not described in this document. The four 4 proposed BLRT Extension project area basins are depicted in **Figures 2 and 3**. Some of the delineated basins are natural wetlands whereas others are excavated in uplands for the purpose of stormwater management. Delineated basins are described in narrative below and summarized in **Table 1** on page 8.

#### 2.2.1.1 Wetlands Numbers 1 to 13

These hydrologically isolated basins all are located north of TH 610 and have been mapped by the updated NWI variously as PEM1A, PEM1C, and PFO1A. Wetland Numbers 4, 9, 10, and 12 were not mapped by the updated NWI. These basins are fully or partially underlain by hydric soils and have been hydrologically modified as a result of dwindling ground water over the past several decades. Most of these basins are dominated by invasive plant species such as reed canary grass.

#### 2.2.1.2 Wetland Number 51

Wetland Number 51 is located just north of Oak Grove Parkway in the City of Brooklyn Park on the Target Corporation campus. The updated NWI has mapped Wetland Number 51 as PEM1A. The majority of this basin is mapped as being underlain with hydric soil. This basin was excavated in 2004 to provide a wetland mitigation bank to compensate for wetland impacts that resulted from construction of the Target Corporation campus. Perpetual conservation easements have been recorded for Wetland Number 51. A wetland delineation conducted in W51 revealed that only the southern portion of this area meets the criteria of wetlands. Several feet of soil were removed from this basin in order to allow portions of it to function as a restored wetland.

#### 2.2.1.3 Wetland Number 52

Wetland Number 52 is located on the south side of 101st Avenue North within the area associated with the Operations and Maintenance Facility (OMF). Wetland Number 52 was not mapped by the NWI; however, it is mapped in what is predominantly hydric soil. Wetland Number 52 appears to be a natural isolated basin.

#### 2.2.1.4 Wetlands Numbers 14 to 17

These basins are located north of and south of TH 610 and have been excavated for stormwater management. Wetlands Numbers 14 and 15 were excavated in an area that is underlain by hydric soils. Wetlands Numbers 16 and 17 were excavated in non-hydric soils. The updated NWI mapped Wetland Number 14 as PEM1A though it was found based on field data to be a PUBGx, and Wetland Number 16 as PUBGx/PEM1C. The updated NWI did not map Wetlands 15 and 17 but they were both found to be PSS1A.



#### 2.2.1.5 Wetlands Numbers 18 to 25 and 43

These wetlands are described in the Wetland Delineation Report for the West Broadway Avenue Reconstruction project and are not included in this report.

#### 2.2.1.6 Wetland Number 26

Wetland Number 26 is a small isolated roadside ditch located approximately 500 feet north of Brooklyn Boulevard on the west side of West Broadway Avenue. This ditch was not mapped by the updated NWI and it is not underlain by mapped hydric soils. Wetland Number 26 was field verified to be a PEM1A. It was excavated in uplands for the purpose of stormwater management associated with the parking lots to the west.

#### 2.2.1.7 Wetlands Numbers 27 to 30

Wetlands Numbers 27 to 30 are used for stormwater management and are located between Interstate 94 and Highway 100. Wetland Number 27 is mapped by the updated NWI as PEM1C and is not underlain by hydric soils. Wetland Number 28 is mapped by the NWI as PABGx/PEM1C (field verified to be PFO1A) and is underlain by hydric soils. Wetland Number 29 is mapped by the NWI as PEM1C (and field verified as such) and is underlain by hydric soils. Wetland Number 30 is mapped by the NWI as PUBG/PEM1A (and field verified as such) and is not underlain by hydric soils.

#### 2.2.1.8 Wetland Number 31 (an extension of Wetland Number 32)

Wetland Number 31 is a long linear ditch that extends along the west side of the existing BNSF tracks in the City of Robbinsdale, roughly between Lowry Avenue North and 35th Avenue North. The updated NWI has mapped this basin as PSS1A/PABG/PEM1A (field verified as PSS1A) and it is not underlain by mapped hydric soils. This railroad ditch was created long ago and the plant communities that have developed over time have matured into a functioning mosaic of wetland types.

#### 2.2.1.9 Wetlands Numbers 32, 33, and 45

This wetland complex is located within the City of Robbinsdale along the west side (Wetlands Numbers 32 and 45) and the east side (Wetland Number 33) of the BNSF tracks. The updated NWI has mapped this complex as PUBG/PFO1A/PSS1C/PEM1C/PEM1F/PABG. These wetlands were field verified to be PFO1A, PUBGx, and PFO1A, respectively. The southern tip of Wetland Numbers 32 and 45 is underlain with mapped hydric soil; however, the middle and northern portion of this complex is not mapped with hydric soils. Wetland Number 33 is not underlain with mapped hydric soils. Wetland Number 32 lies partly within Walter Sochacki Park. Wetland Number 33 is also known as Grimes Pond and is in part within South Halifax Park.

#### 2.2.1.10 Wetland Number 34

Wetland Number 34 is located approximately 350 feet west of the BNSF tracks partly within the City of Robbinsdale and partly within the City of Golden Valley. The updated NWI has mapped Wetland 34 as PABG, PEM1F, PEM1A, and PFO1A. Field data revealed that the mosaic of wetland



types present in this large complex is similar to what is mapped by the updated NWI. Most of this wetland is underlain with mapped hydric soils. Wetland Number 34, also known as South Rice Pond, lies within Walter Sochacki Park.

#### 2.2.1.11 Wetlands Numbers 35 and 36

Wetlands Numbers 35 and 36 are located within the City of Robbinsdale, roughly between 26th Avenue North and 29th Avenue North, on the west side (Wetland 35) and east side (Wetland 36) of the BNSF tracks. Wetland Number 35 is mapped by the updated NWI as PEM1F (field verified as PFO1A) and Wetland Number 36 is mapped as PSS1A (field verified as the same). Neither wetland is mapped as being underlain by hydric soils. Wetlands Numbers 35 and 36 were excavated as ditches for stormwater management.

#### 2.2.1.12 Wetland Number 37

Wetland Number 37 is a linear ditch along the west side of the BNSF tracks and the east side Kewanee Way in the City of Golden Valley. The updated NWI has not mapped this ditch as a wetland and the soil survey has not mapped hydric soils here. Field data verified this wetland to be a PEM1A. Wetland Number 37 was excavated in uplands for stormwater management.

#### 2.2.1.13 Wetland Numbers 38 and 39

Wetlands Numbers 38 and 39 are located in the City of Golden Valley just north of Golden Valley Road on the west side (Wetland Number 38) and east side (Wetland Number 39) of the BNSF tracks. The updated NWI has mapped these basins as PUBG, PABG and PF01A. Field verifications confirmed both basins to be PUBGx. The soil survey has not mapped hydric soils in these basins. Wetland 38 lies within Sochacki Park: Mary Hills Management Unit. Wetland Number 39 lies partly within Minneapolis Park and Recreation Board land.

#### 2.2.1.14 Wetlands Numbers 40 and 50

Wetlands 40 and 50 are parts of a linear ditch along the east side of the existing BNSF tracks, near 16th Avenue North, in the City of Golden Valley. The updated NWI mapped Wetland Number 40 as PFO1A and did not map Wetland Number 50. The soil survey did not map hydric soils in this ditch. Wetlands Numbers 40 and 50 were excavated in uplands for stormwater management.

#### 2.2.1.15 Wetland Number 41

Wetland 41 is a linear ditch located along the east side of the BNSF tracks, just north of Plymouth Avenue North, in the City of Golden Valley. Wetland 41 was not mapped as wetland by the updated NWI. This wetland was field verified to be a PEM1A. The soil survey did not map hydric soils within Wetland 41 was excavated in uplands for stormwater management.

#### 2.2.1.16 Wetlands Numbers 42 and 49

Wetlands Numbers 42 and 49 are both part of a linear ditches that are located along the east side (Wetland Number 42) and the west side (Wetland Number 49) of the existing BNSF tracks, partly within the City of Golden Valley and partly within the City of Minneapolis. These ditches are located



near the intersection of Xerxes Avenue North and Oak Park Avenue North. Wetland Number 42 was not mapped by the updated NWI though it was field verified to be PSS1A. Wetland Number 49 is mapped by the NWI as PABGx and PFO1A and field verified to be PFO1A. The soil survey did not map hydric soils within these ditches. These ditches were excavated in uplands for stormwater management.

#### 2.2.1.17 Wetland Number 44

Wetland Number 44 is located along the east side of the BNSF tracks between 33rd Avenue North and 35th Avenue North in the City of Robbinsdale, just downslope from the Xcel Indiana substation. Wetland Number 44 is a linear railroad ditch. The updated NWI mapped Wetland Number 44 as PABG (field verified to be PUBGx) and the soil survey did not map hydric soils here.

#### 2.2.1.18 Wetlands Numbers 46 and 47

Wetlands Numbers 46 and 47 are located along the west side of the BNSF tracks, north and south of Plymouth Avenue North, in the City of Golden Valley. This wetland complex is adjacent to Bassett Creek and associated backwaters. The updated NWI has mapped this complex as PFO1A, PEM1A, PEM1C and riverine. These basins were field verified to be mostly PFO1A. The soil survey has not mapped hydric soils within this complex.

#### 2.2.1.19 Wetland Number 48

Wetland Number 48 is located on the east and west sides of the existing BNSF tracks, just north of Olson Memorial Highway, in the City of Minneapolis. Wetland Number 48 is an old channel of Bassett Creek. Wetland Number 48 is mapped by the updated NWI as riverine (R2UBG or R2UBGx) and field verified as such. The soil survey has mapped Wetland Number 48 as non-hydric. Wetland Number 48, now used for stormwater management, enters a large culvert which flows south under Olson Memorial Highway.

#### 2.2.1.20 Pond East of Wetland Number 30

The Pond East of Wetland Number 30 is located in the City of Robbinsdale. This pond appears to have been constructed in uplands for the purpose of stormwater management and is not underlain by mapped hydric soils. The updated NWI has mapped this pond as PUBG.



Table 1. Summary of Delineated Basins within and near the Proposed BLRT Extension Project

Wetland ID	Updated NWI Mapping	Hydric Soil Mapping	Field Verified Cowardin Class.	Eggers & Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (see Figure 2)	Notes			
W1	PEM1A	Yes	PEM1A	Seas. flooded basin	Type 1	1	Natural basin			
W2	PEM1C	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W3	PEM1A	Yes	PEM1A	Seas. flooded basin	Type 1	1	Natural basin			
W4	Not mapped	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W5	PFO1A	Yes	PFO1A	Seas. flooded basin	Type 1	2	Natural basin			
W6	PFO1A	Yes	PFO1A	Seas. flooded basin	Type 1	2	Natural basin			
W7	PEM1A	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W8	PFO1A	Yes	PFO1A	Seas. flooded basin	Type 1	2	Natural basin			
W9	Not mapped	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W10	Not mapped	Yes	PEM1A	Seas. flooded basin	Type 1	2	Roadside ditch			
W11	PEM1A	Partially	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W12	Not mapped	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W13	PEM1A	Partially	PEM1A	Seas. flooded basin	Type 1	2	Natural basin			
W14	PEM1A	Yes	PUBGx	Deep marsh	Type 4	3	Excavated for stormwater management			
W15	Not mapped	Yes	PSS1A	Shrub carr	Type 6	3	Excavated for stormwater management			
W16	PUBGx/PEM1C	No	PUBGx	Deep marsh	Type 4	4	Excavated for stormwater management			
W17	Not mapped	No	PSS1A	Shrub carr	Type 6	4	Excavated for stormwater management			
W18–W25 are part of the West Broadway Avenue Reconstruction project	See Wetland Deline	See Wetland Delineation Report for the West Broadway Avenue Reconstruction project								
W26	Not mapped	No	PEM1A	Seas. flooded basin	Type 1	8	Excavated for stormwater management			



Table 1. Summary of Delineated Basins within and near the Proposed BLRT Extension Project

Wetland ID	Updated NWI Mapping	Hydric Soil Mapping	Field Verified Cowardin Class.	Eggers & Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (see Figure 2)	Notes
W27	PEM1C	No	PEM1A	Seas. flooded basin	Type 1	10	Excavated for stormwater management
W28	PABGx/PEM1C	Yes	PFO1A	Seas. flooded basin	Type 1	11	Excavated for stormwater management
W29	PEM1C	Yes	PEM1C	Shallow marsh	Type 3	13	Natural basin, likely excavated to augment stormwater management
W30	PUBG/PEM1A	No	PUBGx	Open water	Type 5	14	Excavated for stormwater management
W31	PSS1A	No	PSS1A	Shrub carr	Type 6	16	Natural basin
W32	PFO1A	Partial	PFO1A	Seas. flooded basin	Type 1	17	Natural basin
W33	PABG	No	PUBGx	Open water	Type 5	17	Natural basin, enhanced for stormwater management
W34	PEM1F/PABG	Yes	PEM1F	Deep marsh	Type 4	17	Natural basin, perhaps excavated to augment stormwater management
W35	PEM1F	No	PFO1A	Seas. flooded basin	Type 1	17	Natural basin, enhanced for stormwater management
W36	PSS1A	No	PSS1A	Shrub carr	Type 6	17	Natural basin
W37	Not mapped	No	PEM1A	Seas. flooded basin	Type 1	17	Railroad ditch
W38	PFO1A/PABG	No	PUBGx	Open water	Type 5	18	Excavated for stormwater management
W39	PFO1A	No	PUBGx	Open water	Type 5	18	Natural basin, enhanced for stormwater management
W40	PFO1A	No	PEM1A	Seas. flooded basin	Type 1	19	Natural basin
W41	Not mapped	No	PEM1A	Seas. flooded basin	Type 1	19	Railroad ditch, stormwater management



Table 1. Summary of Delineated Basins within and near the Proposed BLRT Extension Project

Wetland ID	Updated NWI Mapping	Hydric Soil Mapping	Field Verified Cowardin Class.	Eggers & Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (see Figure 2)	Notes					
W42	Not mapped	No	PSS1A	Shrub carr	Type 6	20	Railroad ditch, stormwater management					
W43 is part of the West Broadway Avenue Reconstruction project	See Wetland Deline	ee Wetland Delineation Report for the West Broadway Avenue Reconstruction project										
W44	PABG	ABG No PUBGx Open water Type 5 16 Natu										
W45	Not mapped	Partial	PFO1A	Seas. flooded basin	Type 1	16	Natural basin					
W46	PFO1A	No	PFO1A	Seas. flooded basin	Type 1	19	Partially natural basin, partially excavated for stormwater management					
W46 (riverine)	R2UBG	Yes	R2UBG	Riverine	Riverine	19	Channel of Bassett Creek					
W47	PEM1C	No	PFO1A	Seas. flooded basin	Type 1	19	Partially natural basin, partially excavated for stormwater management					
W48	R2UBG	No	R2UBGx	Riverine	Type 4	20	Old backwater of Bassett Creek, partially excavated to augment stormwater management					
W49	PFO1A	No	PFO1A	Seas. flooded basin	Type 1	20	Railroad ditch					
W50	PFO1A	No	PEM1A	Seas. flooded basin	Type 1	19	Natural basin					
W51	PEM1A	Yes	PEM1A	Seas. flooded basin	Type 1	3	Wetland Mitigation Bank for Target Corporation					
W52	Not mapped	Partial	PEM1A	Seas. flooded basin	Type 1	1	Natural basin					
Pond east of W30	PUBG	No	PUBG	Open water	Type 4	14	Excavated for stormwater management					

<sup>&</sup>lt;sup>1</sup> Wetland types based on *Wetland Plants and Plant Communities of Minnesota and Wisconsin* by Eggers and Reed (USACE St. Paul District).
<sup>2</sup> Wetland types classified based on US Fish and Wildlife Circular 39.



## **2.2.2** Streams and Other Aquatic Resources

Bassett Creek and associated backwaters flow through and near a large portion of the proposed BLRT Extension project from North Rice Pond south to Olson Memorial Highway. The headwaters of Bassett Creek is Medicine Lake in Plymouth, and its confluence with the Mississippi River is in the City of Minneapolis. Along its entire length, Bassett Creek is currently listed on the MPCA 303(d) List of Impaired Waters. Aquatic recreation is impaired as a result of high fecal coliform. Aquatic life is impaired as a result of high chloride and stressors affecting the fish community in Bassett Creek.

**Table 2** summarizes those areas within the proposed BLRT Extension project area that are designated as DNR public waters, public waters wetlands, or public watercourses.

Table 2. Summary of DNR Public Waters, Public Waters Wetlands, and Public Watercourses within the Proposed BLRT Extension Project Area

Public Waters ID <sup>1</sup>	Wetland Basin ID	Notes
644W	Wetlands 32 and 33	North Rice Pond and Grimes Pond
651P	Wetland 46	Backwaters of Bassett Creek near Plymouth Avenue
36P	Wetland 48	Backwaters of Bassett Creek near Olson Memorial Highway
Bassett Creek	Adjacent to Wetland 46	Channel of Bassett Creek

Source: DNR Public Waters Inventory

<sup>&</sup>lt;sup>1</sup> "W" indicates DNR public waters wetlands; "P" indicates public waters; unnumbered waterbodies indicate public watercourses.



# 2.2.3 Notable Aquatic Habitats within the Proposed BLRT Extension Project Area

**Table 3** summarizes characteristics and locations of four notable aquatic habitats within and near the proposed BLRT Extension project; the North and South Rice Ponds Complex, Grimes Pond, Golden Valley Ponds Complex, and the Theodore Wirth Regional Park Complex (Bassett Creek and associated backwaters). In the context of this technical report, the term *notable* is used in a general sense and signifies larger wetlands with a variety of wetland habitats and functions.

Table 3. Notable Aquatic Habitats within and near the Proposed BLRT Extension Project Area

Aquatic Habitat	Location	Total Size (ac)	Wildlife Associations
North and South Rice Ponds	Cities of Robbinsdale and Golden Valley on west side of existing BNSF tracks	24.72	Habitat for frogs and toads, turtles, snakes, potential habitat for common rough fish species
Grimes Pond	City of Robbinsdale on the east side of existing BNSF tracks	7.41	Habitat for frogs and toads, turtles, snakes, potential habitat for common rough fish species
Golden Valley Road Ponds	North side of Golden Valley Road on both sides of the existing BNSF tracks	5.08	Habitat for frogs and toads, turtles, snakes, potential habitat for common rough fish species
Theodore Wirth Regional Park (Bassett Creek and backwater)	North and south of the Plymouth Avenue Bridge on the west side of the existing BNSF tracks	11.85	Habitat for frogs and toads, turtles, snakes, potential habitat for common rough fish species

Sources: Field data collection (Council, 2015) and the National Wetland Inventory (updated 2013)



# 2.3 Environmental Consequences

### 2.3.1 Wetland Impacts within the Proposed BLRT Extension Project Area

Wetlands were delineated along the proposed BLRT Extension project and associated facilities during the spring and summer of 2015. The wetlands inventoried along with potential impacts by wetland type are summarized in **Table 4**. **Table 4** also describes a portion of the delineated basins as being currently used as stormwater ponds and others as being natural wetland basins. The jurisdictional status of all delineated basins in the proposed BLRT Extension project area with respect to WCA and USACE has been established based on agency review and concurrence with conclusions in the *Technical Memorandum: Jurisdictional Issues Associated with Delineated Basins; Blue Line Extension LRT.* **Table 5** summarizes wetland impacts data per delineated basin. Impact areas are shown in **Figure 2** beginning on page 25.

Standard erosion control best management practices (BMPs) would be used for work within adjacent wetland and aquatic resources where necessary, minimizing impacts to the waterbodies down slope and to aquatic wildlife.

Table 4. Disturbance or Fill in Delineated Basins for the Proposed BLRT Extension Project by Wetland Type

Wetland Type (Circular 39)¹	Wetland Type (Eggers and Reed) <sup>2</sup>	Total Impacts (acres)	Impacts Requiring Mitigation for WCA (acres)	Impacts Requiring Mitigation for USACE (acres)
Type 1	Seasonally Flooded Basin	6.5824	4.2731	2.5166
Type 4	Deep Marsh	2.4892 0.1038		1.0138
Type 5	Open Water	3.6152	1.6922	0.4195
Type 6	Shrub Carr	0.5010	0.2124	0.2124
Riverine	Riverine	450 linear feet (Bassett Creek)	450 liner feet (Bassett Creek)	450 linear feet (Bassett Creek)
	Total	13.1878	6.2815	4.1623

<sup>&</sup>lt;sup>1</sup> Wetland types classified based on US Fish and Wildlife Circular 39.

<sup>&</sup>lt;sup>2</sup> Plant communities classified based on *Wetland Plants and Plant Communities of Minnesota and Wisconsin* by Eggers and Reed (USACE St. Paul District).



Table 5. Wetland Disturbance or Fill for the Proposed BLRT Extension Project

Wetland ID	Potential Wetland Impacts (acres)	Potential Stormpond Impacts	Hydric Soil Mapping	Field Verified Cowardin	Eggers and Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (See Figure 2)	Notes
W1	0.0000	_	Yes	PEM1A	Seas. flooded basin	Type 1	1	Natural basin
W2	0.0000	_	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W3	0.0000	_	Yes	PEM1A	Seas. flooded basin	Type 1	1	Natural basin
W4	0.1357	_	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W5	0.0000	_	Yes	PFO1A	Seas. flooded basin	Type 1	2	Natural basin
W6	0.0000	_	Yes	PFO1A	Seas. flooded basin	Type 1	2	Natural basin
W7	0.2869	_	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W8	0.0254	_	Yes	PFO1A	Seas. flooded basin	Type 1	2	Natural basin
W9	0.0012	_	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W10	_	0.0000	Yes	PEM1A	Seas. flooded basin	Type 1	2	Roadside ditch
W11	0.0000	_	Partially	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W12	0.0565	_	Yes	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W13	0.5333	_	Partially	PEM1A	Seas. flooded basin	Type 1	2	Natural basin
W14	-	0.6058	Yes	PUBGx	Deep marsh	Type 4	3	Excavated for stormwater management
W15	-	0.0000	Yes	PSS1A	Shrub carr	Type 6	3	Excavated for stormwater management
W16	_	0.8194	No	PUBGx	Deep marsh	Type 4	4	Excavated for stormwater management
W17	_	0.0000	No	PSS1A	Shrub carr	Type 6	4	Excavated for stormwater management



Table 5. Wetland Disturbance or Fill for the Proposed BLRT Extension Project

Wetland ID	Potential Wetland Impacts (acres)	Potential Stormpond Impacts	Hydric Soil Mapping	Field Verified Cowardin	Eggers and Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (See Figure 2)	Notes
W18–W25 are part of the West Broadway Avenue Reconstructi on project	_	_	_	_	_	_	_	_
W26	_	0.0100	No	PEM1A	Seas. flooded basin	Type 1	8	Excavated for stormwater management
W27	-	0.0000	No	PEM1A	Seas. flooded basin	Type 1	10	Excavated for stormwater management
W28	0.4303	_	Yes	PFO1A	Seas. flooded basin	Type 1	11	Excavated for stormwater management
W29	_	0.0000	Yes	PEM1C	Shallow marsh	Type 3		Natural basin, likely excavated to augment stormwater management
W30	_	0.0000	No	PUBGx	Open water	Type 5	14	Excavated for stormwater management
W31	part of W32	-	No	PSS1A	Shrub carr	Type 6	16	Excavated for stormwater management
W32	1.2544	_	No	PFO1A	Seas. flooded basin	Type 1	17	Excavated for stormwater management



Table 5. Wetland Disturbance or Fill for the Proposed BLRT Extension Project

Wetland ID	Potential Wetland Impacts (acres)	Potential Stormpond Impacts	Hydric Soil Mapping	Field Verified Cowardin	Eggers and Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (See Figure 2)	Notes
W33	1.692 <sup>3</sup>	-	No	PUBGx	Open water	Type 5	17	Excavated for stormwater management many years ago.
W34	0.0000	_	Yes	PEM1F	Deep marsh	Type 4	17	Natural basin, perhaps excavated to augment stormwater management
W35	0.4033	-	No	PFO1A	Seas. flooded basin	Type 1	17	Mostly a railroad ditch excavated for ballast
W36	0.2124	_	No	PSS1A	Shrub carr	Type 6	17	Mostly a wide railroad ditch excavated for ballast
W37	_	0.0755	No	PEM1A	Seas. flooded basin	Type 1	17	Railroad ditch
W38	0.0000	-	No	PUBGx	Open water	Type 5	18	Excavated for stormwater management
W39	1.051	-	No	PUBGx	Open water	Type 5	18	Excavated for stormwater management
W40	0.3127	_	No	PEM1A	Seas. flooded basin	Type 1	19	Railroad ditch
W41	_	0.1917	No	PEM1A	Seas. flooded basin	Type 1	19	Railroad ditch
W42	_	0.2886	No	PSS1A	Shrub carr	Type 6	20	Railroad ditch



Table 5. Wetland Disturbance or Fill for the Proposed BLRT Extension Project

Wetland ID	Potential Wetland Impacts (acres)	Potential Stormpond Impacts	Hydric Soil Mapping	Field Verified Cowardin	Eggers and Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (See Figure 2)	Notes
W43 is part of the West Broadway Avenue Reconstructi on project	_	_						
W44	0.8722	_	No	PUBGx	Open water	Type 5	16	Railroad ditch
W45	1.3465	_	No	PFO1A	Seas. flooded basin	Type 1	16	Excavated for stormwater management
W46 (riverine)	Riverine	_	Yes	Riverine	Riverine	Riverine	19	Channel of Bassett Creek
W46	1.0440	_	No	PFO1A	Seas. flooded basin	Type 1	19	Partially natural basin, partially excavated for stormwater management
W47	(included with W46)	_	No	PFO1A	Seas. flooded basin	Type 1	19	Partially natural basin, partially excavated for stormwater management
W48	0.1540	_	No	R2UBGx	Riverine	Type 4	20	Old backwater of Bassett Creek, partially excavated to augment stormwater management



Table 5. Wetland Disturbance or Fill for the Proposed BLRT Extension Project

Wetland ID	Potential Wetland Impacts (acres)	Potential Stormpond Impacts	Hydric Soil Mapping	Field Verified Cowardin	Eggers and Reed Class. <sup>1</sup>	Circ. 39 Class. <sup>2</sup>	Sheet Number (See Figure 2)	Notes
W49	_	0.1018	No	PFO1A	Seas. flooded basin	Type 1	20	Railroad ditch
W50	0.1176	_	No	PEM1A	Seas. flooded basin	Type 1	19	Railroad ditch
W51	0.2095	_	Yes	PEMA	Seas. flooded basin	Type 1	3	Wetland Mitigation Bank for Target Corporation
W52	0.0461	_	Yes	PEMA	Seas. flooded basin	Type 1	1	Natural basin (disturbed)
Near Wetland 30, not delineated	_	0.91	No	PEMF	Deep marsh	Type 4	14	MnDOT Stormpond

<sup>&</sup>lt;sup>1</sup> Wetland types classified based on Wetland Plants and Plant Communities of Minnesota and Wisconsin by Eggers and Reed (USACE St. Paul District).

 $<sup>^{2}</sup>$  Wetland types classified based on US Fish and Wildlife Circular 39.

<sup>&</sup>lt;sup>3</sup> Wetland impacts of 1.692 acres are the area of the elevated platform above Grimes Pond. Actual impacts are assumed to be less than 1.692 acres and would be the cumulative footprint of the cross-sections of the support piers.



# 2.3.2 Stream and Other Aquatic Resource Impacts within the Proposed BLRT Extension Project Area

A portion of Bassett Creek, a stream reach of approximately 450 feet total length, near the Plymouth Avenue bridge would be relocated to accommodate the Blue Line Extension LRT and associated infrastructure. The upstream limit of the stream relocation would be approximately 200 feet north of the Plymouth Avenue centerline, and the downstream limit would be approximately 250 feet south of the Plymouth Avenue bridge centerline. This reach of Bassett Creek would be moved approximately 20 feet west. The final design of the creek realignment will include considerations for construction staging to ensure that flow rates are managed and to ensure safe discharge of the flows during construction. These may include diversion and pumping and scheduling the construction during winter when the flows are typically low.

**Table 6** summarizes impacts to those areas within the proposed BLRT Extension project area that are designated as DNR public waters, public waters wetlands, or public watercourses.

Table 6. Summary of DNR Public Waters, Public Waters Wetlands, and Public Watercourses within the Proposed BLRT Extension Project Area

Public Waters ID <sup>1</sup>	Wetland Basin ID	Potential Impacts (acres or linear feet)	Notes
644W	Wetlands 32 and 33	1.692 ²	North Rice Pond and Grimes Pond
651P	Wetland 46	1.0440	Backwaters of Bassett Creek near Plymouth Avenue
36P	Wetland 48	0.1540	Backwaters of Bassett Creek near Olson Memorial Highway
Bassett Creek	Adjacent to Wetland 46	Approximately 450 linear feet of Bassett Creek	Channel of Bassett Creek

Source: DNR Public Waters Inventory

<sup>&</sup>lt;sup>1</sup> "W" indicates DNR public waters wetlands; "P" indicates public waters; unnumbered waterbodies indicate public watercourses.

<sup>&</sup>lt;sup>2</sup> Impacts reported here are based on the area of the elevated rail platform. Actual impacts would likely be less and would be based on the cumulative footprint of the support pillars within the public water.



# 2.4 Potential Mitigation

Throughout the planning and design phases of the proposed BLRT Extension project, wetland impacts will be avoided and minimized to the extent practicable. For those wetland impacts that cannot be avoided, suitable wetland mitigation will be required.

The current replacement ratio for wetland credits in the Twin Cities Metropolitan Area including the proposed BLRT Extension project study area is 2.5 to 1, although under certain conditions it may be reduced to 2 to 1. Such conditions include the use of mitigation that is functioning prior to wetland impacts, mitigation using the same wetland type as the impacts and mitigation geographically close to the impacts. The final amount, type, and location of wetland replacement or bank credits will be determined by the respective permitting agencies during final design and the permit review process.

Wetland mitigation for the proposed BLRT Extension project will be accomplished through a combination of on-site wetland mitigation and purchases of private wetland credits from existing mitigation banks in suitable Major Watersheds and Bank Service Areas. As presented in the Minnesota Interagency Water Resource Application (the joint Section 404/WCA wetland permit application—see **Appendix I** of the Final EIS) 4.1623 acres of the wetland impacts within the proposed BLRT Extension project will require mitigation under USACE requirements, and 6.2815 acres of wetland impacts will require mitigation under WCA requirements. Much of the USACE and WCA jurisdictional impacts overlap; the wetland permit application notes that about 12–14 acres of wetland mitigation will be required. The remainder of delineated basins are stormponds and would require storm volume replacement but not wetland mitigation. Given the urbanized and rapidly urbanizing nature of the proposed BLRT Extension project area, on-site wetland mitigation opportunities are somewhat limited. Some mitigation opportunities are being considered within Theodore Wirth Regional Park within the proposed floodplain mitigation area associated with Bassett Creek. Opportunities to combine wetland mitigation and floodplain mitigation are being studied.

The entire proposed BLRT Extension project alignment lies within the "<50 percent area" of Minnesota, Major Watershed #20 (Mississippi River – Twin Cities) and Bank Service Area (BSA) 7. Thus, purchases of private wetland mitigation credits will first be sought within the "<50 percent area" of Minnesota, BSA 7 and Major Watershed #20. Purchase of credits form Hennepin County banks will be prioritized. However, as a result of the scarcity of suitable credits within Hennepin County, additional suitable credits will likely be purchased from banks in Carver County. The search for suitable private wetland credits will be expanded to adjacent BSAs and Major Watersheds if needed, though a mitigation ratio higher than 2:1 would typically apply in this scenario.

The reach of Bassett Creek near the Plymouth Avenue Bridge will be moved several feet to the west. During construction, this reach of Bassett Creek will be diverted to accommodate the required instream work. Mitigation for these impacts to Bassett Creek will use appropriate erosion control and stream restoration methods.

Standard erosion control BMPs will be used for work within adjacent wetland and aquatic resources where necessary, minimizing impacts to the waterbodies down slope and to aquatic wildlife.



## 3 References

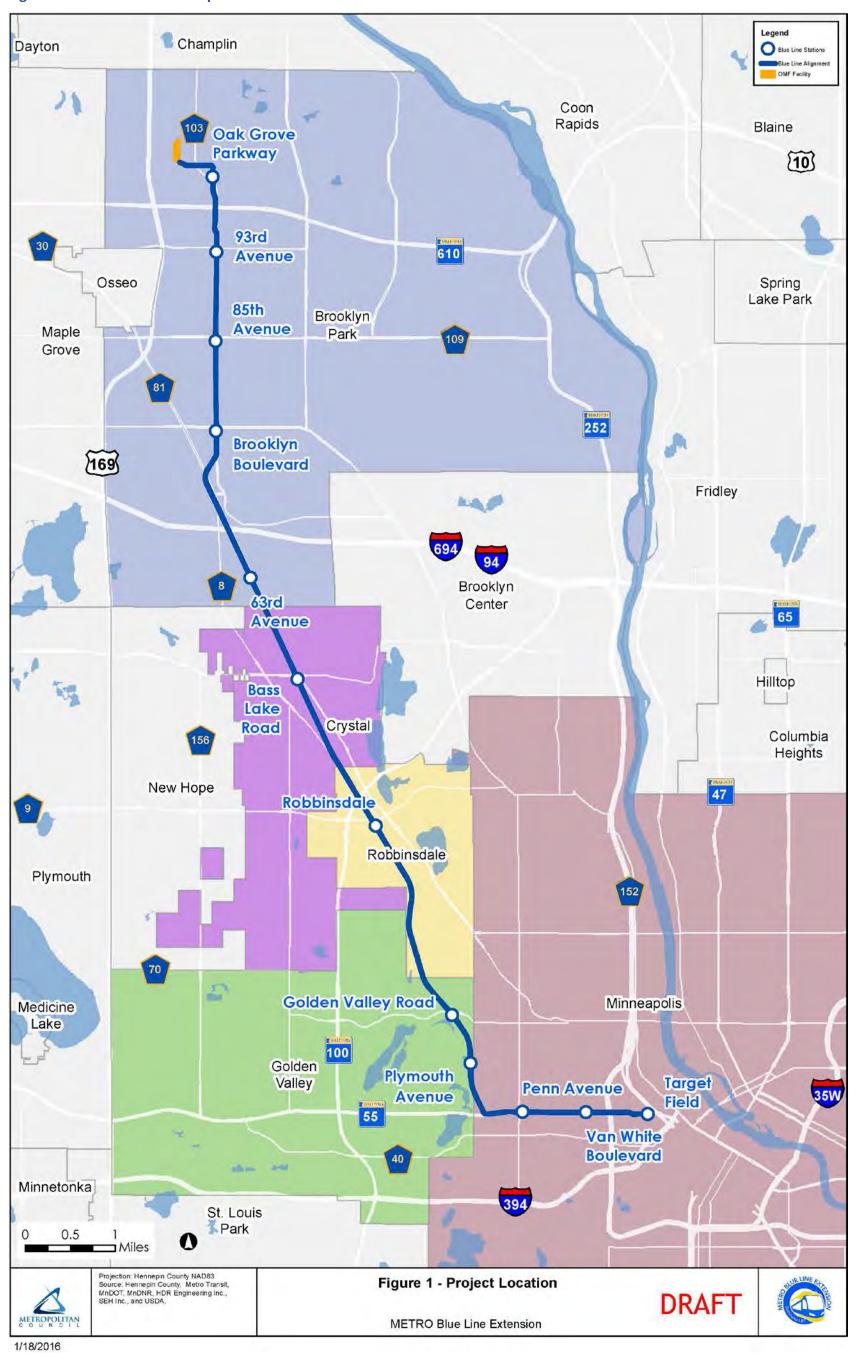
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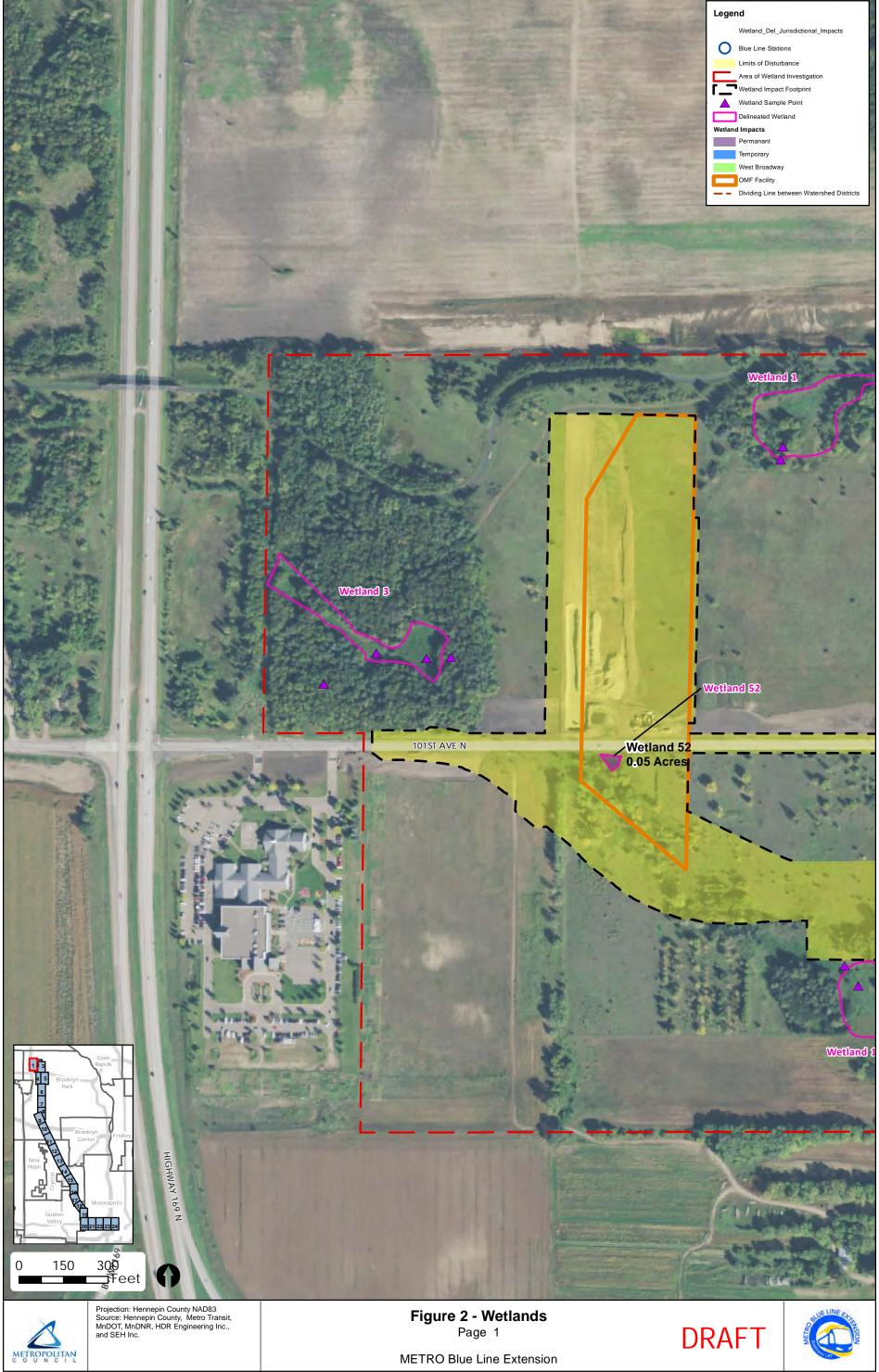


**Figure 1. General Location Map** 

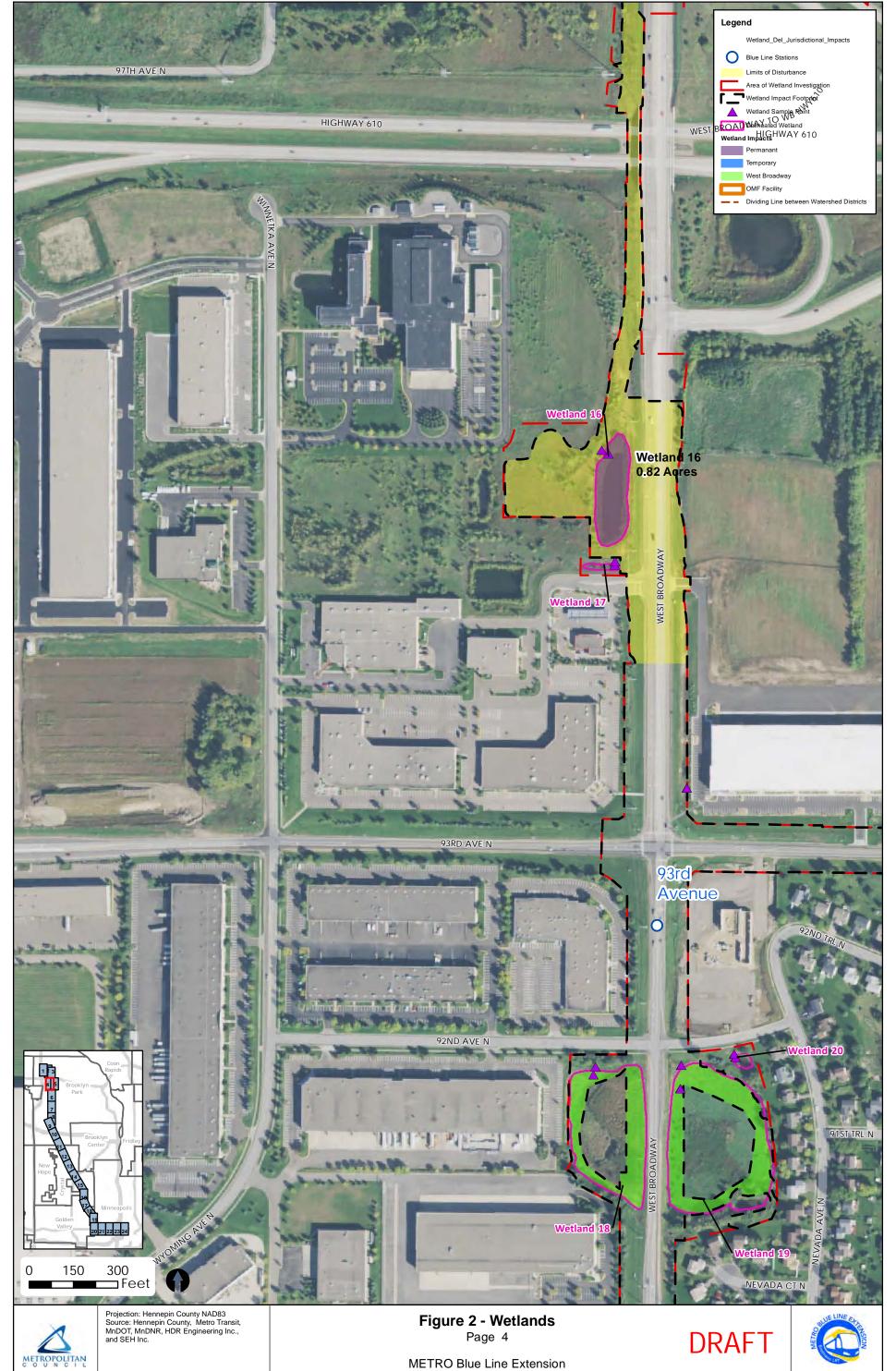


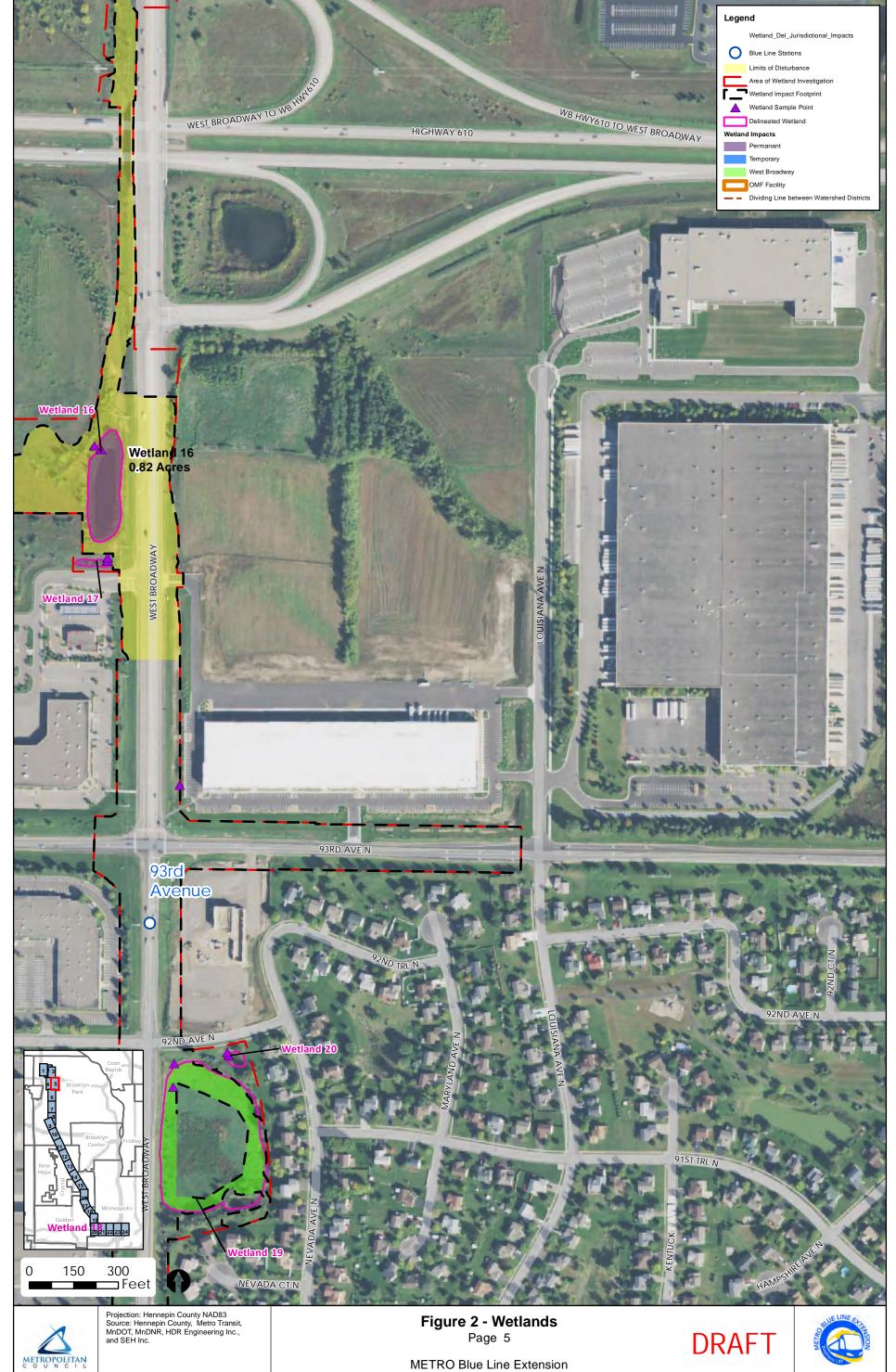


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Legend





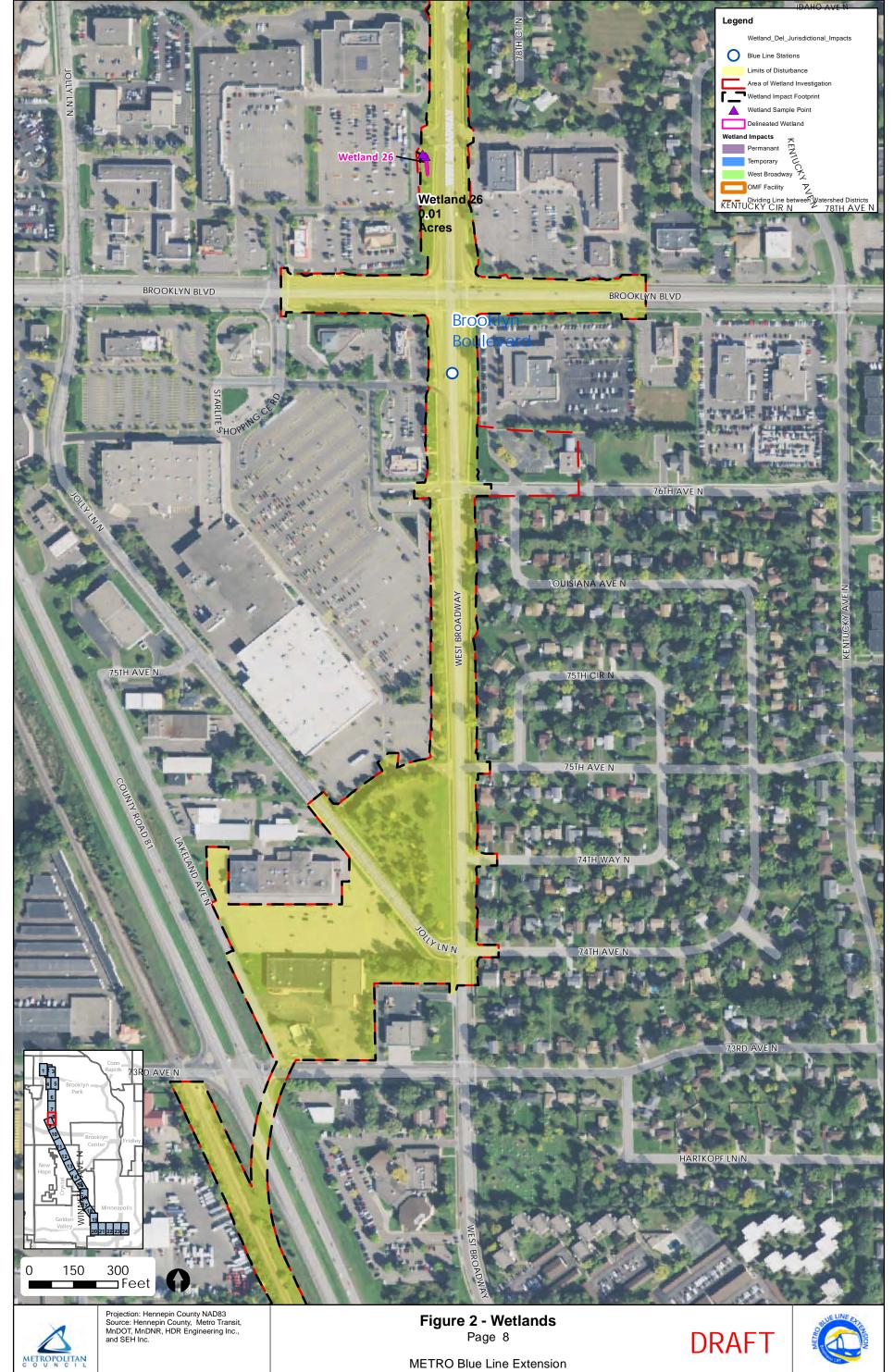


85th

Avenue

Legend

Wetland\_Del\_Jurisdictional\_Impacts



Legend

Delineated Wetland

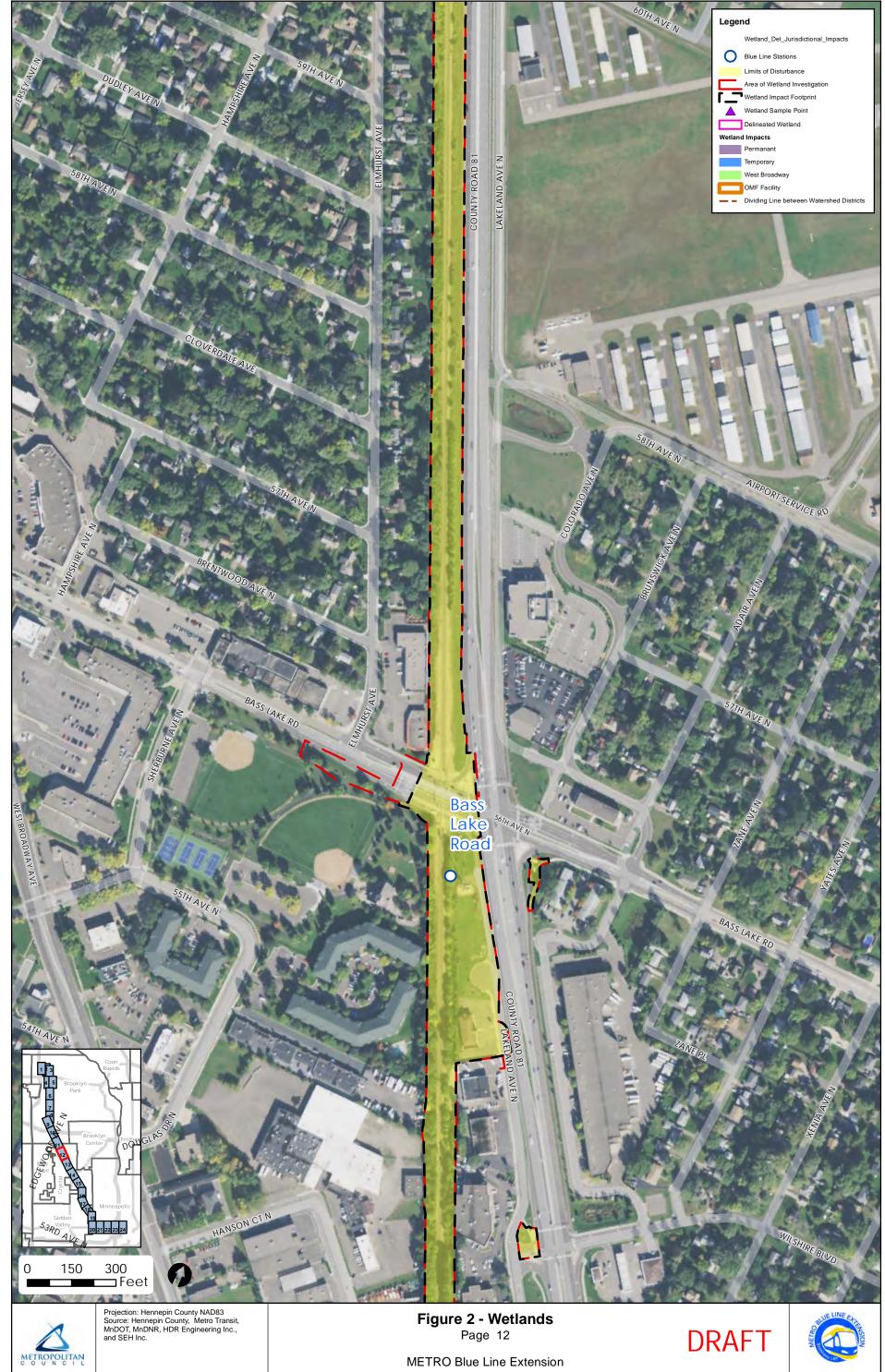
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65//

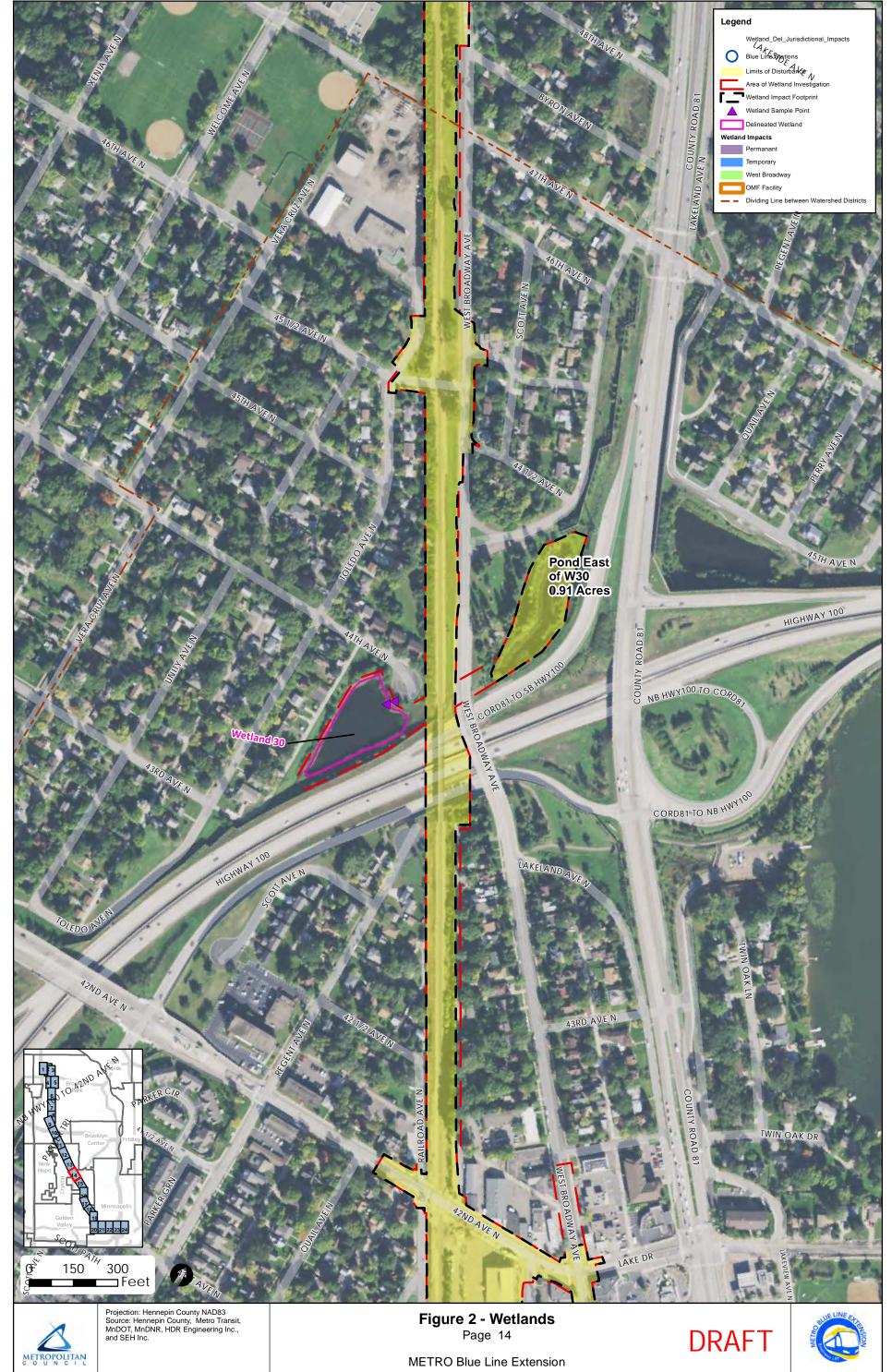
Wetland\_Del\_Jurisdictional\_Impalses

N

Legend





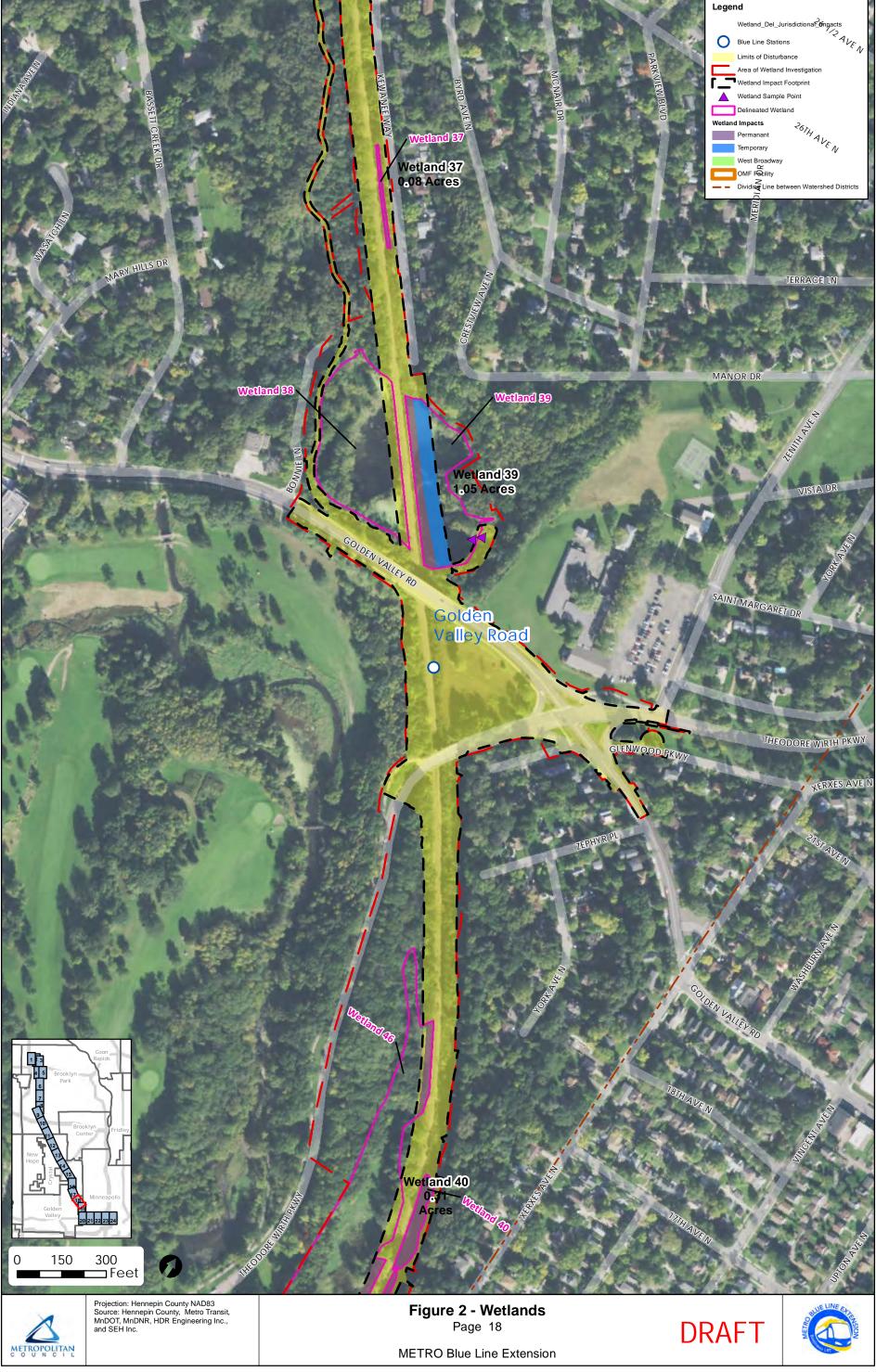




37TH AVE N

Legend

Wetland\_Del\_Jurisdictional\_Impacts

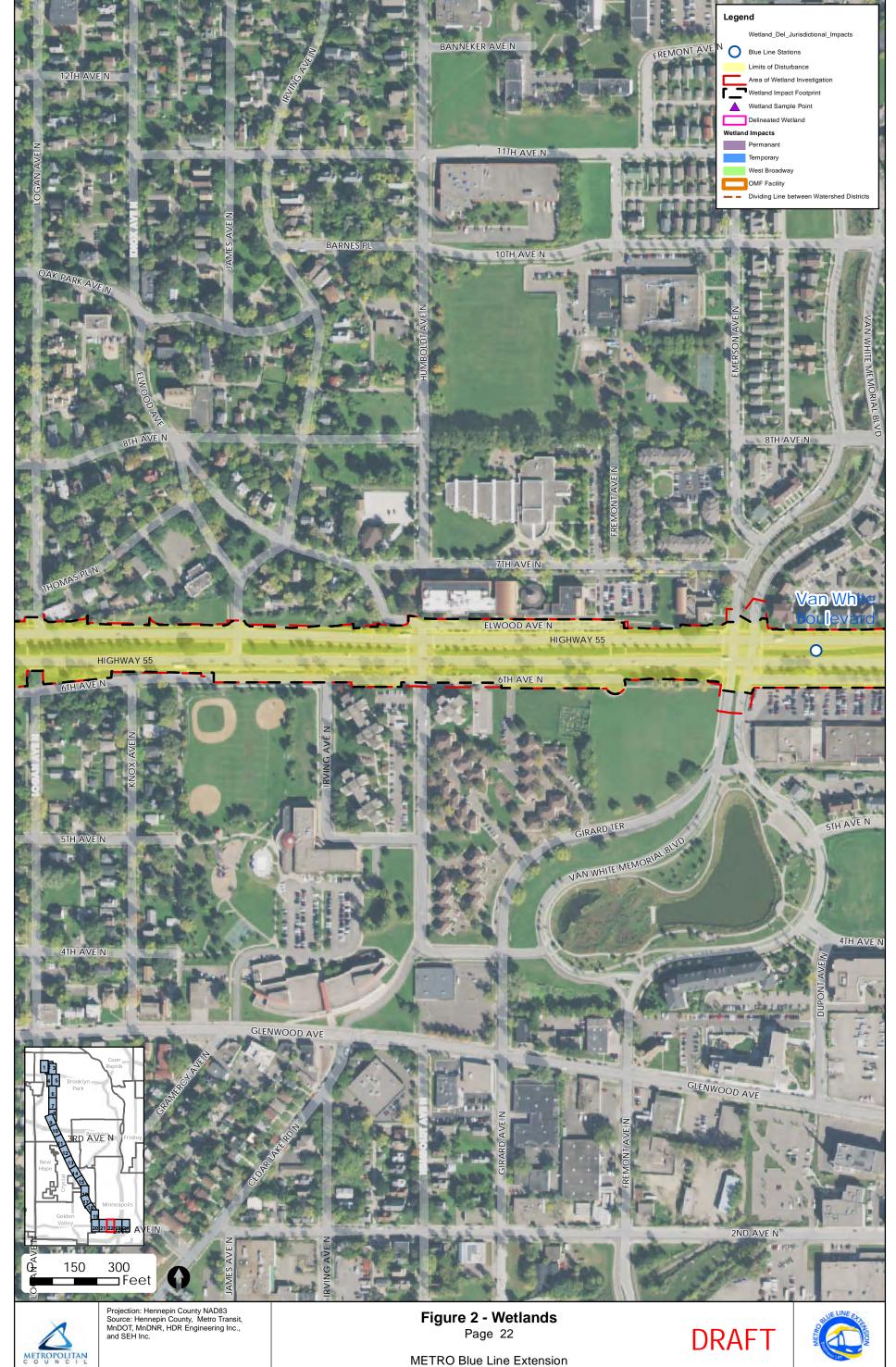


GOLDEN VALLEY RD

18TH AVE N

12TH AVE N
Wetland\_Del\_Jurisdictional\_Impacts







METRO Blue Line Extension

WEST RIVER PKWY N

Legend

D1B

D25A

Legend

Blue Line Stations

LOD Footprint

D20

D20A 882

Legend  $^{87\,\text{\AA}}$ 

D67A

D25A<sub>Legend</sub>

D17A

D21A

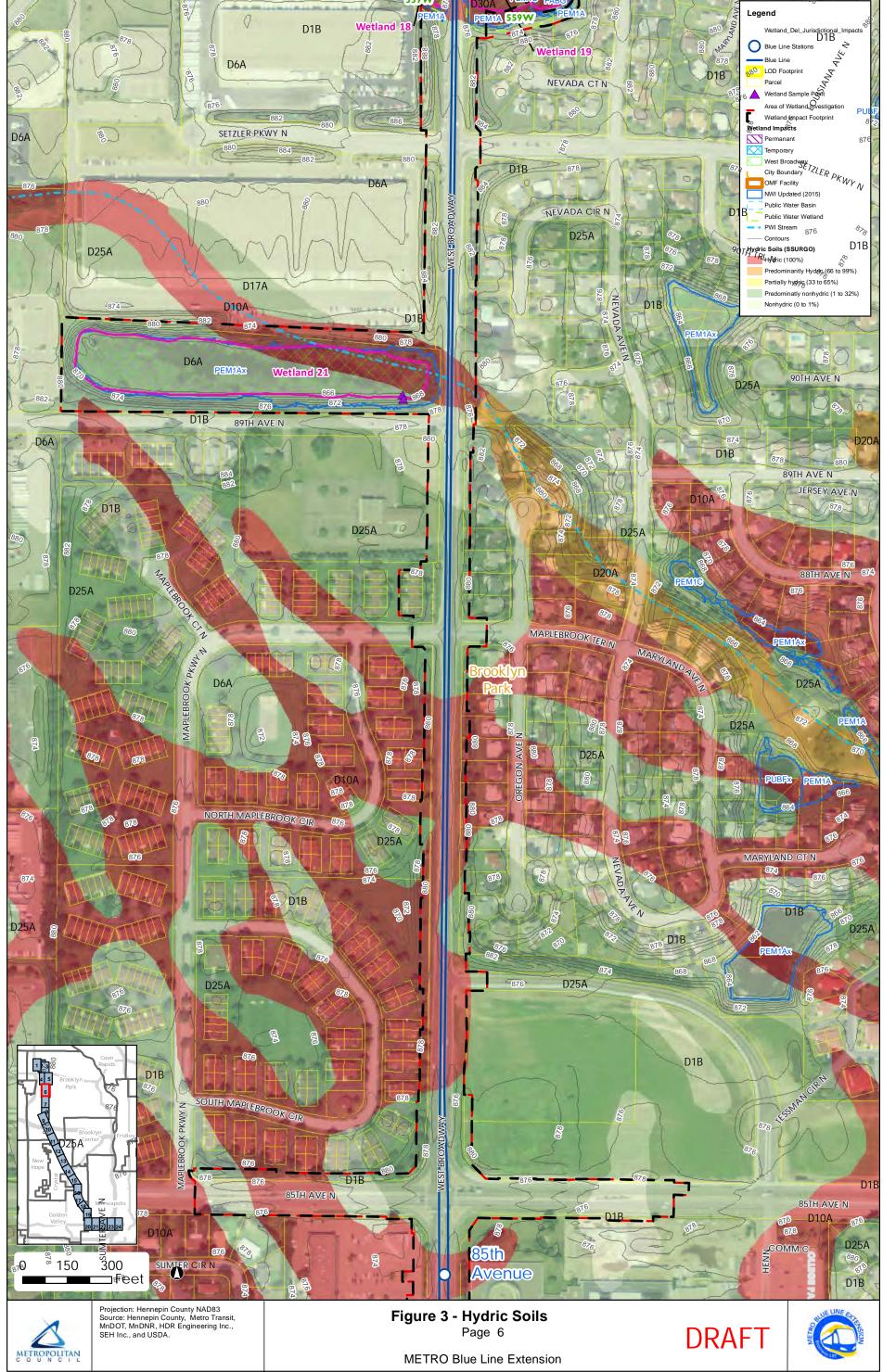
872

D25A

D20

Legend

D25A



85th 876

**Avenue** 

SUMTER CIR N

D25A

D1B

Legend

Blu D1n Aations

D20A

Legend

Blue Line Stations

Blue Line Stations

LOD Footprint Parcel

Wetland Sample Point

Area of Wetland Divertification
Wetland Impact Footprint

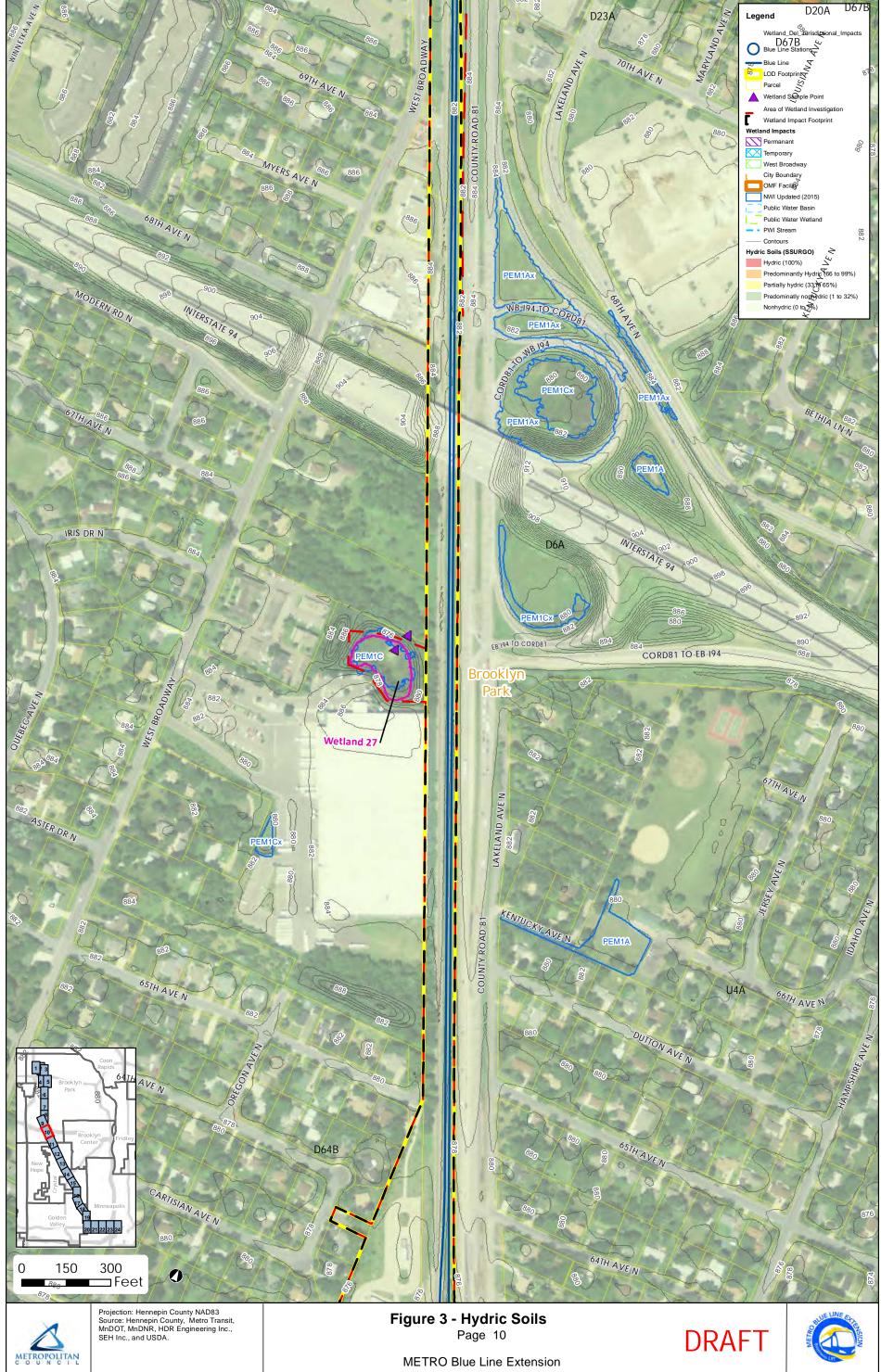
874 PUBFx

D6B

75TH AVEN

L62C2

872



CARTISIANAVEN

D64B

U4A

Blue Line Stations

Legend

876 876 1 urisdictional Lympacts

60TH AVEN

Legend

D31A

Legend WILSHIRE Wetland\_Del\_Jurisdict@dalyJmpacts

Wetland\_Del\_Juriso

Blue Line Stations

LOD Footprint

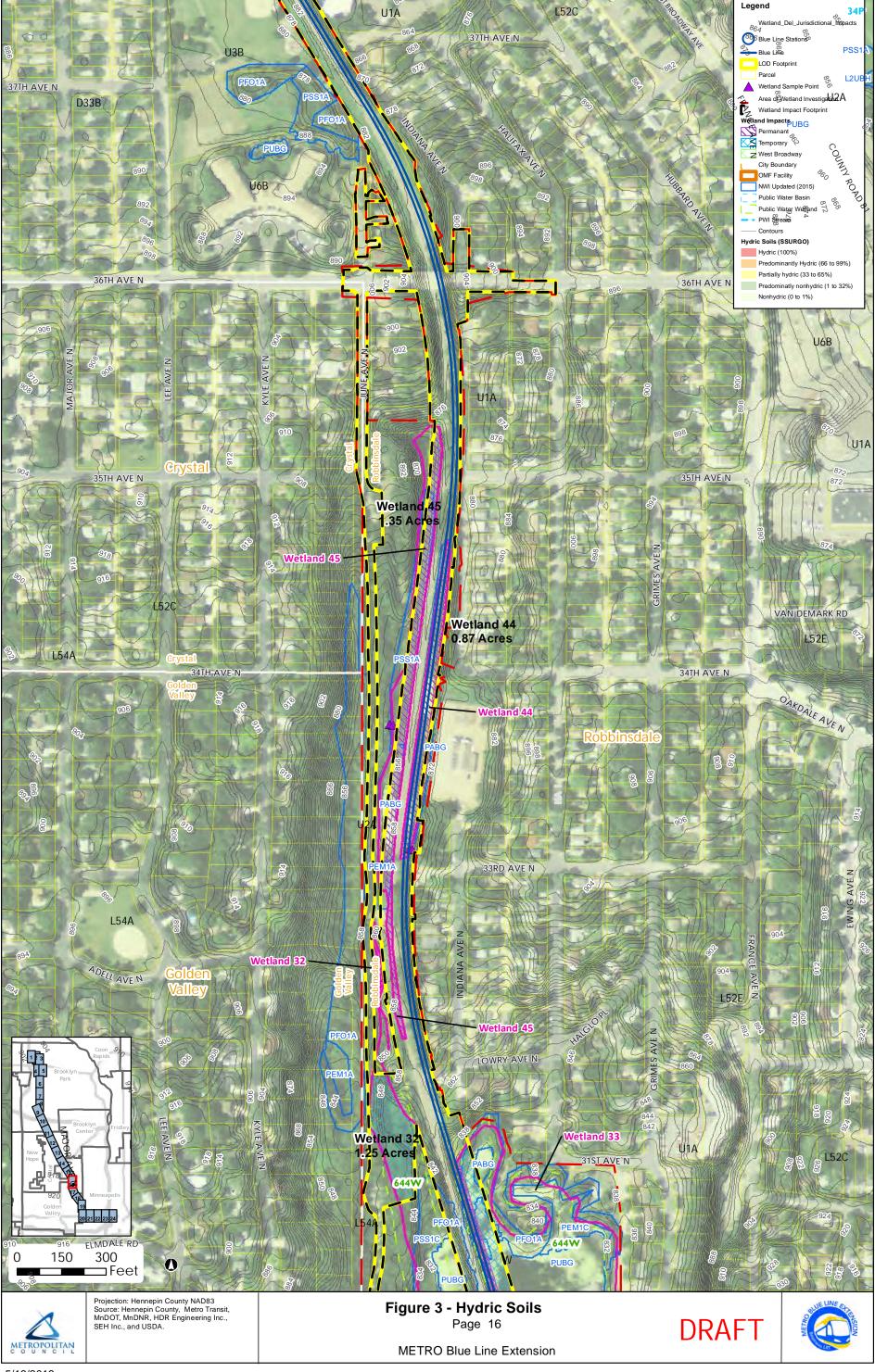
U1A Legend

LAKEDR

Blue Line Stations

LOD Footprint

U2A)



33RD AVEN

Legend

L52C

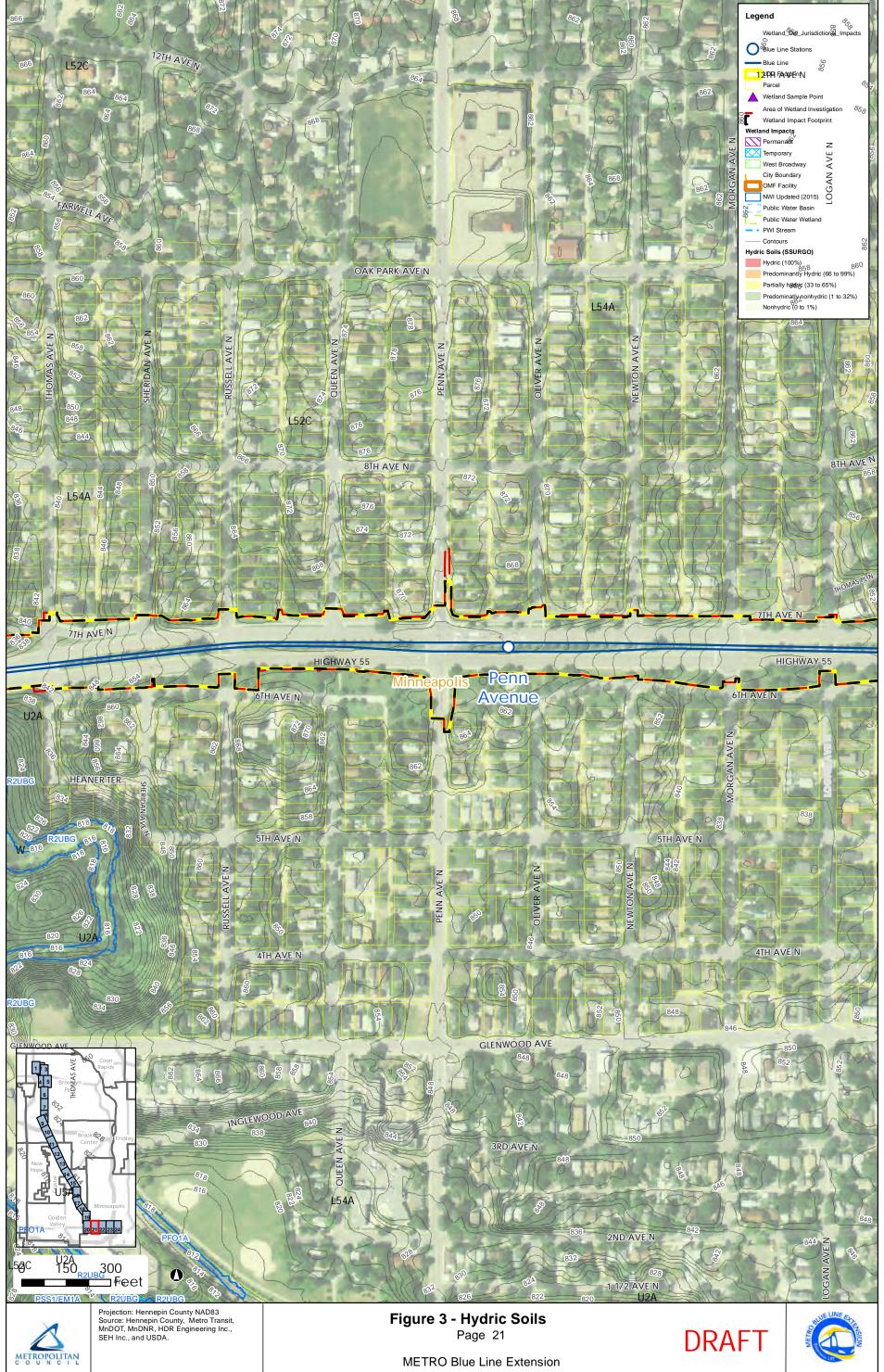
L52C

Legend %

PEM1A

U<sub>2</sub>A

12TH AVE N Wetland\_Del\_Juriso



BANNEKER AVE N

834

Legend

Blue Line Stations

FREMONT AVE N

L52C

D64B

11TH AVEN

Legend

Blue Line Stations LOD Footprint

Wetland Impacts Nermanant Permanant

West Broadway
City Boundary OMF Facility NWI Updated (2015)

U1A

Wetland Sample Point

Area of Wetland Investigation

Wetland Impact Footprint

824

U5A

Legend<sub>NEST</sub> RIVER PKWY N